# The Builder.

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Design for a Chapter-House.—By Mr. John Begg, A.R.I.B.A. ..... *Double-Page Ink-Photo.*
Section of Mr. John Begg's Design for a Chapter-House ..... *Single-Page Photo-Litho.*
Design for a Stone Railway-Bridge (Awarded the Grissell Gold Medal).—By Mr. Harold Harlock ..... *Double-Page and Single-Page Photo-Litho's.*


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## *The Architecture of the Lake Dwellings of Europe. II.**

THE Lake Dwellings of Great Britain form a class far more numerous than at first might be supposed, and now that attention has been drawn to their existence, it is probable that a few more years will add materially to the lengthening list. The Crannoges of Ireland have been noted by Sir W. R. Wilde, Mr. Shirley, and others, and later, these and many examples in Scotland, by Dr. Monro, whose monograph, published in 1882, renders an extended list. They were frequently formed on shallow islands, but not unfrequently built up with boughs and deposited material upon the bed of a shallow lake, the area being first enclosed by a framework of piles to keep the structure in position. The examples given by Dr. Monro render full details, and also of the manner in which several of the sites indicate continuance of occupation, and many structural alterations. Nevertheless, the objects found, up to the present time at least, do not possess very high antiquity, and there are records of their occupation to quite recent times.

Various sites in England and Wales have been partially investigated, and among these certain sites in Holderness, now on dry, or at most on marshy land, but once covered with water, appear to be counterparts of the pile dwellings of Switzerland, as far as the meagre investigations have been followed. They have been met with so late only as 1881 during some extended drainage works, and piles and relics of apparently great age were discovered. It is greatly to be hoped that some one or other of these promising sites may be systematically explored. In 1886 General Pitt Rivers described a remarkable area in London-wall, which on being laid bare by excavations for a new warehouse was found to be the site of a timbered structure having many piles and planks. Its existence within the City is subject for comment, and the more so since the objects found were not older than Roman times, possibly later.

London antiquaries have not to be reminded that the entire course of the Walbrook, which enters the City close to this site, is bounded by piles, but which have no reference, so far as has yet been pointed out, to timbered dwellings. But at Southwark, on the shallow banks of the River Thames, a discovery was made which seems to point to a construction very analogous to the Swiss dwellings. In 1866, the late Mr. Wimble reported to the British Archæological Association that a site on the south side of Southwark-street, between the square and Winchester-street, was covered with piles 7 ft. to 11 ft. long, and their heads about 12 ft. beneath the modern level. Masses of Kentish rag had been used to steady them. Wherever the excavations were carried for a new building these piles were found. Mr. Syer Cuming testified at the same time to their existence in what had been the marshy ground of Moorfields, and elsewhere in the north of London.

The articles of the Stone Age are in many cases wrought with very great mechanical skill, and neatly finished, while there are many curious evidences of straight sawing through and the perforation of hard material, most probably by friction caused by rapidly moving a board or a stick for the latter purpose, with sharp sand and water for the cutting material. The labour with which so many thousands of trees were felled, and their trunks pointed to form the piles for the platforms, all indicate a considerable amount of skill of no mean order,—certainly not the work of savages.

But actual ornamentation occurs on some of the pottery, doubtless of late date in the Stone Age, which is fully developed in the succeeding one. Some of the Bronze Age pottery is of elegant form, very neatly turned on the wheel, and ornamented with graceful lines and mouldings, the patterns in some few instances being filled in with a white substance. But the most remarkable development found in Switzerland is the ornamentation of pottery with an inlay of tinfoil. The well-known dish found at Cortaillod is of great beauty, the pattern being of considerable intricacy. A vase found at the same place is similarly ornamented, as is also a few fragments found at La Crasaz, and some other places.

One fragment of pottery found elsewhere was ornamented with fine triangular cuttings of beech fixed to it by asphalt, and either asphalt or, as supposed by Dr. Dom, of Tübingen, an adhesive glue derived from beech bark, was used with charcoal for a black glaze.

The Weavers' art has furnished several really elaborate designs, while one figured by Keller, found at Irgenhausen, is of very great elaboration and artistic beauty. But it is the bronze articles that claim our particular attention. The greatest number are admirably wrought, and present a multiplicity of forms. The fibulæ and other personal ornaments are covered with lines, dots, perforations, &c., while some objects supposed to relate to religious uses are occasionally met with. These consist principally of moon-shaped figures. The cross has been found punctured on crockery at Polado, and a tin cross was found at Peschiera, both, of course, of pre-Christian date. A bronze vase, cast, found in Lake Bouget, is a remarkable article, but many others, bowls, horse-trappings, a chariot wheel, lance heads, &c., demand notice. The swords of bronze are numerous, and of considerable interest, since they agree in many respects with the forms of Roman swords, and also with many of the fine examples found in the north of Europe, having curves at the ends of the handles. The pear-shaped blades are of common occurrence, and found under circumstances that entirely forbid their being considered of Roman date.

The most remarkable group of iron implements yet found are the swords and scabbards from La Tène—the Marin of the older antiquaries. They are ornamented with raised patterns in a variety of ways, all of great interest, and of a style generally called late Celtic. One has three quaint animals in relief. The general resemblance of these articles to four others found at Lisnacroghera, Ireland, has been pointed out by Dr. Monro. It remains to call attention to an interesting discovery recorded in 1890 by Mr. A. T. Evans, M.A., at Aylesford, Kent, where in an interment of a form seldom met with in England, some bronze articles were

* See p. 277, *ante*.

found ornamented in a style so remarkably like that of the La Tène swords as to fully justify the inference that both works were the production of one people. It is impossible to enter into the arguments that were adduced which seem to show the emigration of a people westward. But, in addition to traces of their presence in Switzerland and England alike, must now be added Lisnacroghera.

The archaic type of the pottery found in all the early settlements has been referred to by many foreign writers, and Dr. Deschmann has pointed out the remarkable resemblance which exists between the early pottery found by Dr. Schliemann at Hissarlik and that which has been met with at the sites of lake dwellings in Laibach Moor, Carniola. There is resemblance also between the jadeite articles found at Troy and similar ones in Switzerland. The latter district has produced many articles of pure copper. In fact, these have been found in such numbers as to give some warrant for the belief in an age of copper as well as of bronze.

The number of sites which have been explored, or partially so, up to the present time, being so great, it necessarily follows that, since every settlement has been found to be prolific of relics, the quantity of articles found has been enormous. Many examples are scattered abroad, but a large number remain in private collections in Switzerland and in the other countries where the sites occur; while, fortunately, various local museums, notably those of Switzerland, have fine collections, for the most part carefully arranged. In the British Museum is a small but very interesting assortment of articles, one of many things for which the nation is indebted to Mr. Franks. There are examples of almost all the varying relics that have been found.

The objects found on the sites consist of stone and flint implements, scrapers, hatchets, arrow-heads, &c. Pins and many other articles worked in various kinds of bone; clay weights for nets; spindle whorles; pottery, made by hand in the earliest examples, and on the wheel in the later ones, the clay showing gradations of skill in the working, pebbles and many fragments of quartz being found in the earliest, and much better baking in the latest. The Bronze Age produced a vast number of implements of all descriptions and classes, while some few sites in Switzerland have produced worked gold in small quantities.

Flint is not common in Switzerland, and in many sites there is reasonable ground for believing that it was an article of import, as was certainly the obsidion used for scrapers and such-like, which have been found in small quantities. Nephrite or jadeite has already been mentioned.

The articles found on various sites present curious points of resemblance to others met with at distances far removed; there being many points of difference, while the recurrence of some indicate that the sites were occupied mainly by fishermen, others more particularly, perhaps, by hunters.

Weaving utensils are found in some places, while others are destitute of them. Corn and fruits appear in like manner. But it has to be remembered that only a very few sites have been systematically explored, and fewer still in any very extended manner, except the Terpen of the Low Countries, although, their removal having been for agricultural purposes and not for research, it follows of necessity that many relics have been lost. Everything indicates, in the Swiss examples, at least for the most part, a steady and continuous occupation from very remote times until the mode of building over water was abandoned altogether. Some sites are found to be of the stone age, no articles of metal being found, with indications of conflagration and abandonment. The same is observable in others of the bronze age, but many indicate that occupation was continuous, through the earliest to a late period, the relics being in some instances found above one another. In others, the earliest examples of stone, &c., are close to shore, while articles of the bronze period are found farther away.

The Iron Age in Switzerland has produced some fine and remarkable articles; but it does not appear to have been of long duration.

The various articles, when studied in any of the well-arranged museums, where the specimens are of sufficiently comprehensive character, present a remarkably perfect and complete gradation from the rude works of the earliest period of these articles down to historic times,—the latter is marked by the presence of a few Gaulish and other coins, and, lastly, of Roman pottery. Traces of the Roman occupation on the lake-dwelling sites are, however, so very few in number as to warrant the belief that then the practice of occupying them had all but ceased. To indicate the retention of sites in some cases, it has been recorded that some Frankish and German relics have been found; while, as we have seen, the system of construction with but little variation was continued in the Dutch and other settlements, occupied until even later date.

That the first founders of these sites were well advanced in civilisation appears to be proved by the skilful nature of their buildings and the presence of implements, showing that they were good weavers, hunters, and agriculturalists. The latter is abundantly testified to, not alone by the cultivation of wheat of more than one kind, flax, fruits, and even of grapes.

The inquiry has often been made, with reference to these discoveries, as to the period of time when they were erected.

A very cursory examination of the objects found in the sites is sufficient to show that, so far as the Swiss examples are concerned, the dwellings were erected at very various periods, extending from a remote stone age of antiquaries, although Neolithic rather than Palæolithic, to late times, while it is no doubtful conjecture that several of the modern villages which line the margin of the lakes are the representatives from Mediæval times of the sites of remote antiquity which lie buried opposite to many of them deep beneath the waters. We also possess evidences further than that of the objects found which give an idea of the extreme remoteness of time since the foundations of some of these structures were laid. The lake of Zug affords important indications in this direction. In excavating for the erection of the Keltenhof Hotel, in the suburbs of the Town of Zug, on a site among the houses, the workmen came upon a bed of decayed organic matter at a depth of about 5 ft. Piles were also found, and all the usual deposits of a lake dwelling, including evidences that the settlement had been destroyed by fire. The site is 60 ft. distant from the present waters of the lake, and as much as 15 ft. higher than their present level. The excavations showed very clearly that when the piles were driven the site was covered with water. This, too, is not an isolated instance, for further research has shown that there are several more sites around the borders of the lake of Zug, all now being on dry ground, away from the level, and high above its waters. The lake has shrunk materially in its volume, which points to a period of remote antiquity since the settlements were founded. There is no historical evidence whatever of any convulsion of nature that would account for the change, but there is a dim tradition that the waters once were higher.

The articles found on all the sites around the lake of Zug belong for the most part to the Stone Age, which affords further evidence of their great age.

Many of the sites, not alone in Switzerland, but elsewhere as well, are found on dry land covered with a growth of peat, affording evidence of remote antiquity. Thus, to refer to the well-known and important settlement of Rubenhausen, which occupies an extent of about three acres, the site is found to be now 2,000 paces from what was the ancient shore. The growth of peat has so completely encroached upon the waters of the entire lake that the remains of the piles are now covered with a depth of about 6 ft. of that material, which exists above the relic bed, the latter having 3 ft. more of thickness. All this encroachment must have taken place since the piles were placed in position. There are abundant traces that this settlement was consumed by fire.

The observations made by M. Louis Rochat on the lake dwellings found in the neighbourhood of Yverdon, have the same tendency as at Rubenhausen. At Les Uttins, also, he describes vast deposited plains which have been formed between the present borders of the lake and the pile dwellings which are now entirely covered, one site being 1,850 yards from the water, and another 2,200, the whole of this mass of added material having been deposited by a little torrent, La Baine, and he makes some weighty observations as to the extreme length of time that must have elapsed to enable the deposit to have been formed. This site has evidently been of long duration, since articles of stone have been found here, as well as a great many of the bronze age.

Several others of the Swiss sites, as we have seen, indicate that the first settlements were made fairly close to the shore; and at a later period, probably owing to the silting up of the lakes, piles were driven beyond the original site into deeper water beyond. The articles of stone do not compare in antiquity to the implements found in drift deposits, but their high antiquity is attested by many facts. Thus, at St. Aubin, flint arrow-heads have been found white with age, and yet in the bronze period they have been resharpened for re-use. In Switzerland, traces of wild animals are found in the earliest period, such as the large ox with large semilunar horns, which has been found in a fossil state in Italy, there contemporary with the mammoth and the hippopotamus. Bison has been found at Wauwyl and elsewhere, urus in several places, bos in all its varieties in early and in late settlements. The great preponderance of wild animals disappears in the Bronze Age, when traces of domestic animals appear, mainly such as now exist. Wheat is small in the early settlements and larger in the later ones, but wild plants do not evidence any change, having undergone no cultivation, and as they appear in the earliest sites so are they now.

These discoveries reveal to us the state of the arts at a remote period. But they also stand as evidence (if any were wanted) of the exceedingly slow nature of the changes which evolution has wrought on the earth's surface. We find, over and over again remains of animals and vegetables which agree with those still on the earth, or of some well-known type of animal easily recognised, but now extinct or absent from the district. We have already spoken of the various varieties of bos and other extinct animals. The beaver, not now in Carinthia and its district, has been proved by discoveries on Laibach Moor to have been common there. The marsh-pig is recognised by its bones in many of the Swiss sites. Wheat of many varieties, as there may be to-day improved by cultivation, but still wheat, has been found in a burnt state in many places. The oak, the fir, the cherry, all the other kinds of timber used in the various constructions, have all been identified, not only on one site, but on many throughout the whole area of these investigations; showing that, at what appears a comparatively remote era in the history of man, the conditions under which he lived were still much the same as in the present day.

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Workhouse Extensions, Patricroft, Lancashire.—On the 6th inst., at the fortnightly meeting of the Barton Board of Guardians, Mr. Noah Robinson presiding, the Clerk reported that the Local Government Board had given its sanction to the amended plans prepared by Messrs. Mangnall & Littlewoods, architects, for the workhouse extensions at Patricroft, and that tenders had been invited for the foundations for the first block of buildings. The cost of the proposed alterations, inclusive of land, will be 30,000*l.*

## NOTES.

THERE seems some hope that the monument to the Duke of Wellington by Stevens may at last be dragged out from the obscure corner in St. Paul's Cathedral where it can *not* be seen, and placed where the artist always hoped and expected it was to go, in a central position in the nave. We do not know what special circumstance may have prompted Sir F. Leighton's letter to the *Times* on the subject at the present moment, but it seems that he has ascertained that we now at least have the support of the Dean and Chapter of the Cathedral, which is the most important point to be gained, and in that case it is only a question of funds. It is hoped that there are a sufficient number of persons in England who feel interest in a great work of art to subscribe the sum required for moving the monument, which is estimated at about 1,000*l.**; though of course we are aware that to the majority of Englishmen the subject is of no consequence at all. They have got a monument to Wellington; they can go and look at or take their friends to see; as to who the sculptor was or what his merits they mostly know and care as little as they do about the unsatisfactory position of the monument. No great monument, could be treated worse than this has been. On the only side on which it is lighted you must stand close under it to see it; on the only side on which you get a comprehensive view the lower portion is barred off by a screen, and the sculptures of the upper portion are reduced to dark masses seen in outline against the light. In the nave the monument would make a grand central object, quite in keeping with the style of the cathedral. Then would follow the question of completing the monument by the equestrian figure at the top. The monument certainly requires that both in regard to design and sentiment; the idea was that the figure of the dead warrior below was to be contrasted with his living presentment above. A portrait-figure of the man only will not suit the proportions of the monument; it is designed for an equestrian group. Some persons, we believe think it incongruous to have a horse in the church, though they would never be troubled by the incongruity of grotesque carvings in a Mediæval church. The horse is one of God's creatures (as Kingsley would have said), and a very noble one, and very architecturesque in his lines and design. And as to precedent, have we not the De Brezé monument in Rouen Cathedral, with its equestrian statue which has stood there for many generations without scandalising any one?

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THE recent fall of a piece of stonework from the north-west tower of Lincoln Minster may be regarded as fortunate, both as drawing the attention of the Dean and Chapter to the dilapidated condition of that part of the fabric, and as diverting it from other more questionable projects. The stone which fell was a portion of one of the vertical mouldings of the octagonal north-west staircase turret of the Perpendicular belfry stage. These mouldings are throughout applied externally, and are kept in their place by bond-stones running into the wall at intervals. An examination conducted by the Cathedral mason proves that these bond-stones are mostly much decayed, and that the mouldings resting on them, together with much of the surface decoration, are in a perilous state of insecurity. All portions likely to fall have now been removed, and insecure places have been temporarily pointed and cemented to stop further damage. This work, however, has only extended to the west side of the tower, which threatened danger to life; but it is only too clear that the stonework of the other three sides is equally decayed, and demands immediate attention. The beautiful pierced parapet is in an especially bad condition, and only needs a strong gale to bring it over bodily. The Dean and Chapter are waiting for Mr. Pearson's report on the tower generally; but there is good reason to believe that the fabric itself is structurally sound, the decay extending no further than the external ornamental features, which, in the lower Norman stages, as well as in the Perpendicular upper storey, are much dilapidated. The most serious structural feature is a crack extending from south to north, and gradually widening along the crown of the barrel vault of a wall passage in the upper part of the Norman screen in front of the tower. This seems to indicate that the front wall is parting from the tower behind it, and that the two will require to be tied together with iron rods, as was successfully done by Mr. Pearson in the south-western tower a few years back. We shall anxiously wait for Mr. Pearson's report. Under the most favourable circumstances, the expenditure required must be large, and will probably effectually stop any unnecessary work.

* Sir F. Leighton and the Dean and Chapter of St Paul's have already set an example by subscribing 50*l.* each.

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THE paper by the Rev. A. C. Headlam, on "A newly discovered Byzantine church in Cilicia," read at the meeting of the Hellenic Society on Monday and illustrated by drawings and photographs, introduced to our knowledge a curious and interesting example of a building which seems to form a link between Classic and Byzantine architecture. The plan is a curious mingling of the Basilica form with a kind of hint of the future central treatment of the plan, which was to characterise Byzantine architecture proper. The main supports have the plan of the Roman Basilica pier (approximately), but with the centre emphasised on plan and marked on the design by a tower, where the true Byzantine dome would come. The chancel terminates in an apse, and the aisles in small apses adjoining the chancel arch, but with doors in them opening through into two apartments at each side of the chancel. In the western façade are three doorways which present a strange mixture of Classic and Christian feeling; one of them especially, of which a photograph was shown, has all the general characteristics of a Classic doorway with a cornice and architrave mouldings, and consoles at each end of the cornice, but the architrave is decorated with vine-leaf carving in which all Classic feeling seems to have disappeared, and which may be classed as Byzantine work in point of style and feeling. There seems no reason to suppose, however, that the whole of the work is not of the same date; indeed, it is difficult to see how it could be otherwise. The illustrations, which have been prepared by Mr. Schultz, will be published, we believe, in the Hellenic Society's *Journal*. The locality of this interesting discovery is Koja Kalessi. It is to be hoped that some further discoveries of the same interest are still to be made in the district, which may help to fill up the debateable land between the confines of Roman and Byzantine architecture.

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THE result of the international competition for the drainage of Sophia sheds a curious and edifying light upon the way in which things are managed in Bulgaria. The judges consisted of certain officials, two doctors, one geologist, three State engineers, and two civil engineers, the latter a German and an Austrian. Of the twenty-five plans submitted, seventeen were at once excluded, and although none of the remaining eight were declared perfect, their order of merit was announced as follows:—1. "Stoneware" (author, Mr. Momtchiloff, of Sophia). 2. "Circulation pas de stagnation" (Mr. Louis Masson, of Paris). 3. "Properté est la Santè" (Weigand, of Sophia, and Paulsen, of Strasburg). 4. "Tarquinius" (J. and L. Botto, of Rome); whilst the judges recommended the purchase of the other four, which were by Knauff and Grove, of Berlin; Hallenstein and Edwards, of Munich; Brix and Frank, of Wiesbaden; and Aimond, of Paris. So far there seems nothing unusual in the course and result of this competition, but we are now informed that the gentleman, whose design was placed first in the above order, not only was one of the judges, not only attended the meetings, but actually took part in the discussions and deliberations upon his own design. In vain did the German and Austrian (Messrs. Köhn, of Charlottenburg, and Rella, of Brünn), protest and demand Mr. Momtchiloff's exclusion, either as a judge or competitor, and they had to content themselves with refusing to sign the protocol and drawing up a separate statement as a mark of their disapproval of this instance of Bulgarian morals.

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WE are glad to note the appearance,—after much too long an interval,—of a new number of Daremberg & Saglio's invaluable "Dictionnaire des Antiquités" (16, Epi-Eup). Perhaps the most useful article is that by M. Jules Martha, on the Etruscans, which gives an admirably clear *résumé* of the known facts respecting the religion, life, and manners, and especially the monuments, of this problematic people, an account supplementary in many respects to the well-known popular handbook on the subject by the same author. As to the vexed question of origin, M. Martha cites the various hypotheses ancient and modern, and, perhaps prudently, concludes: "Au milieu de tant cohue d'hypothèses le plus sage est de s'abstenir. Un problème qui comporte toutes les solutions possibles est, a vrai dire, un problème insoluble." Perhaps so, but it is strange in glancing through the bibliography of the subject to miss the great names of Otto Crusius and Hesselmeyer,—will the French ever learn to read German? Other articles of interest are those on the structure and management of ancient stables (equitatio, &c.), which seem to have been surprisingly like modern ones. Pompei furnishes us with the plan of two, and at Mondeleia, in Syria, there are substantial remains which may be new to some of our readers. The mythological articles are, as usual, of the weakest.

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THE most important paper in the last issue of the *American Journal of Archæology* (vii., 3) is unquestionably that which deals with the excavations at Eretria. The American plan is to divide out the area to be excavated among various members of the School, Dr. Waldstein, the director, holding, of course, in his hands the general supervision of the whole. Dr. Waldstein was most anxious that the Eretria theatre should not be prematurely dragged into the burning controversy about the Greek stage. As, however, it has been freely quoted on both sides during the past year, he has thought it well to issue at once certain sections of the work and a plan of the theatre as far as at present excavated. The section relating to Epigraphy and Topography has been undertaken by Professor Richards, of Dartmouth College, and the all-important *skene* excavated by Mr. Fossum, late of John Hopkins University, appears in the present number. Still, though offering, as far as possible, all new facilities for the solution of the problem, Dr. Waldstein, with commendable caution, declines to take sides. "This reticence," he says, "I thought called for, because, though what may be called the 'orthodox' view of the Greek stage has had adequate exposition, the new views of Dr. Dörpfeld have not yet been supported by a full and systematic account of the numerous data collected by that eminent archæologist in support of his theories. Pending this publication it did not appear to me wise for archæ logists who had not access to all the material at the disposal of Dr. Dörpfeld, either to accept his views unconditionally or to oppose them." For all details as to this very interesting theatre, we must refer our readers to the easily accessible *Journal*, only reminding them that in a recent number of the *Athenæum*, Professor Pollard, the present director of the school, reports the supplementary excavation of the eastern portion of the orchestra, and the eastern parodos.

THE appointment of a Judge specially to adjudicate on the winding-up of limited companies and of a registrar and official staff should not pass unnoticed. It is of the utmost importance to men of business that the winding-up of companies should be quickly and economically performed. This new departure also emphasises the tendency to the specialisation of legal business which is so marked at the present time. This specialisation cannot stop here; as we have more than once pointed out, patent business should be dealt with by a specially-appointed judge assisted by competent assessors. It would also be very desirable were all cases relating to building contracts, which are referred to the official referees, assigned to one particular referee who also should have the assistance of an architect. What may be called a more pronounced "business" spirit is required in the transaction of the legal work of the country.

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THE Crown lease of the Albert Palace, Battersea Park, will be offered for sale at an upset price of 5,000*l.*, on the 27th instant, at the Mart. The purchaser will be given a right to take the freehold, at a sum to be agreed upon. It is stated that more than 100,000*l.* have been expended upon this ill-starred property. The hall (Messrs. F. & H. Francis, architects) was opened in June, 1885, the late Sir R. Carden, M.P., being at that time chairman of the Albert Palace Company. Three years later, by order of the Court of Chancery, the property, as covering ten acres of land, and held on two leases from the Commissioners of Works for a ninety-one years' term from 1886, at a ground-rent of 1,425*l.* per annum, was put up for sale by auction. No offer, however, was made upon that occasion (June 7, 1888). In the forthcoming sale will be included all the furniture and equipment, together with the great organ that formerly belonged to Mr. W. Holmes, of Primrose-hill. On July 20 last, the Prince of Wales laid the foundation-stone of the Battersea Polytechnic Institute, to be erected near to the Palace, on a site of rather more than two acres, acquired, we believe, from out of the original grounds of the latter. We published a perspective view of Mr. E. W. Mountford's selected design for the Institute, together with his ground-floor plan, on March 28, 1891. We read in the *Times* that Messrs. Holloway have contracted to erect the larger part of the new buildings for 35,988*l.*, and that these will be ready in October of next year.

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THE eighth exhibition of the New English Art Club, just opened at the Dudley Gallery, is much less aggressive in style than most of its predecessors, and in fact many of the works exhibited have no special stamp on them of any artistic school, and impress one merely as sketches by artists of the ordinary profession of faith, who have sent in clever studies which they did not care to finish. Thus Mr. James's "A Writing-table" and "Yellow Polyanthus" (3 and 10) are masterly sketches, the flowers especially, but betray no "mission," any more than Mr. Simpson's "From Southwold Pier" (13) or the "Snow Effect, Whitehall" (16), by Mr. Herbert Marshall, who is not a member of the club, and has indeed very little in common with their apparent aims. The English apostle of impressionism does not exhibit, but there are attempts on the part of other exhibitors to "do Whistler," as in Miss Draper's "Green Signal Lamps, Blue Night" (62), and some others. Among works savouring more of the old leaven of the English Art Club is the "Study for a Portrait in the Open Air" (47) by Prince Troubetzkoy (not a member, however), a three-quarter length sketch of a woman, with a most brilliant open daylight effect, which would look however still better if the picture were finished as to detail and texture, instead of being left in a state of splashes. Mr. Theodore Roussel's portraits of Miss Pettigrew and Mr. Bernard Sickert (50 and 57) have strongly-marked character and fine colour in the costumes, but the artist contrives to impart a very unpleasing colour and texture to the faces. There is character also in Mr. Furse's two portraits of ladies (67, 73), though the "lady in a grey dress" is in a position in which she would find it difficult to maintain her balance. The best portrait in the room is that by Mr. George Thomson (82), a genuine pourtrayal of face and action in a powerful but perfectly uneffected style. Mr. Maitland's sketches of London neighbourhoods (14 and 79) are very good, though it is difficult to understand why in "Oakley Crescent" the tree near the foreground should be far fainter in tone and detail than the houses in the middle distance. Mr. Lindner's "Over the Moonlit Sea" (89) is a charming effect, but has too much light for moonlight. Mr. Hope McLachlan's "Bathers" (95) is a fine little work with no eccentricity about it, but the artist is not a member of the club. In short the conclusion from the contents of the exhibition seems to be that the English Art Club has practically abandoned its colours to some extent; that its members are rather backward in exhibiting, and that the merits of the exhibition may be divided pretty equally between members and non-members.

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IN the Gallery of the "Nineteenth Century Art Society" Mr. Edgar Barclay is exhibiting a set of small paintings of Stonehenge and its neighbourhood, giving "the stones" (as they are called in the district) from every point of view, and giving also various bits of scenery and building within a circuit of three miles round. Mr. Barclay announces a forthcoming book on Stonehenge, with a new inquiry into its meaning and the ideas originally associated with it. Along with the paintings in the exhibition we find a careful survey of Stonehenge and the ground around it, with pen-and-ink drawings of the remains, which we presume are to form a portion of the illustrations of the book. We fear we cannot feel very sanguine that anyone will now be able to throw any more light on the origin, date, and meaning of Stonehenge, but Mr. Barclay's book, when it comes out, may popularise the study of the subject by bringing before the general public considerations and questions which have mostly hitherto been confined to the transactions of learned societies. In the meantime the oil paintings make a very interesting collection even topographically, and some of them are beautiful little works in an artistic sense also. Among these latter may particularly be named "Storm Clouds" (17) and "Thunder Clouds" (27), two very fine studies which make an effective pair; and "Water Meadows below Amesbury Bridge" (32). Our only complaint is that there is rather a want of light in them; "Stonehenge, Midsummer-day" (22), for instance, certainly does not produce the effect of midsummer. Dull weather at the time of our visit, and a consequent unsatisfactory light, may however have had something to do with this.

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A CIRCULAR which is being sent out by "Johnson's Patent Pulley and Lock Manufacturing Co." is an amusing instance of the naïveté with which trading companies propose to associate architects with them in pushing their goods. The circular sets out that "the great success which has lately attended Commercial Companies where the Shares were allotted to the Customers of the Companies—in which case the Shareholders directly influence trade—is the real cause of the large dividends and present high prices of the Shares of such Companies. We lay considerable stress upon the fact that the shares in this Company will be allotted in first instance to the Architectural profession, contractors and buyers of Locks generally, so that most of our Shareholders will be able to influence business to the Company." This is evidently said in entire good faith, and without the least suspicion that there is anything questionable in the position which the company invite architects to take. Are they aware that architects who take their shares are thereby (if the fact is known) disqualified as members of the Institute of Architects?

## THE RED ROCK CANTILEVER BRIDGE.

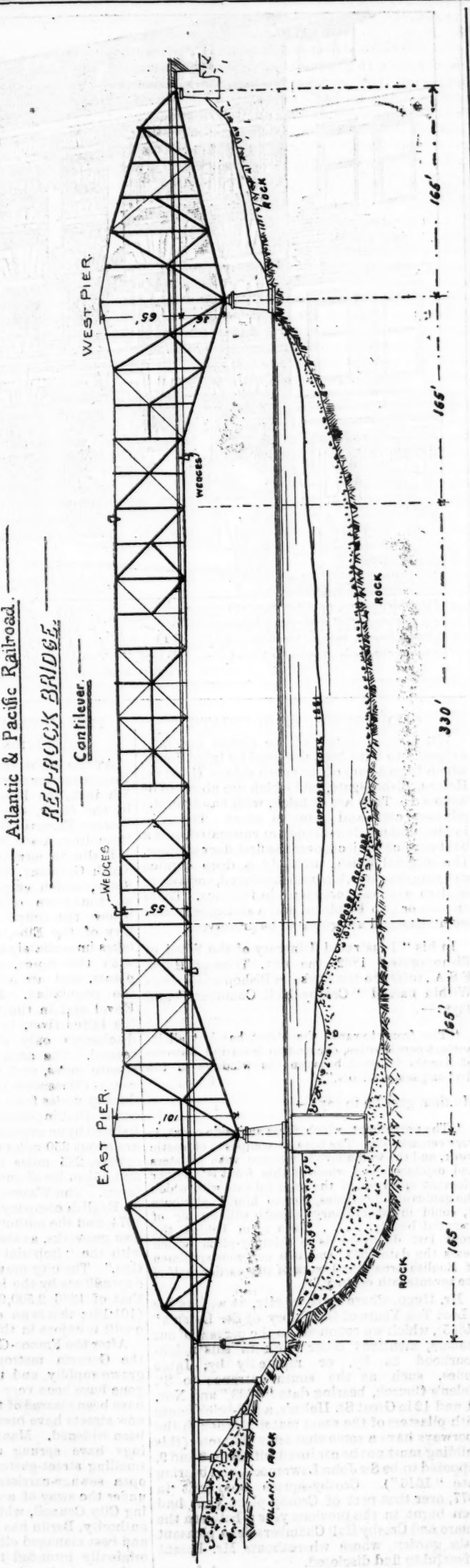
THERE are to be found in the "Transactions of the American Society of Civil Engineers" for last December three papers describing a bridge lately built by the Atlantic and Pacific Railway Company, to carry their line over the Colorado River, at a place known as Red Rock. We are accustomed to find in the contributions made to this Society,—especially when they deal with bridge-work,—descriptions of important undertakings, often executed with great skill and rapidity. The Red Rock Bridge is, however, somewhat an exception to this rule, since it is not a particularly large structure, and, for an American bridge, it was not constructed very expeditiously. Although the work contains many points of interest, its chief importance consists in the lesson it should teach the promoters of such schemes, as well as the engineers who are called upon to carry them out.

The Colorado river over which the bridge passes drains an area of some 230,000 square miles, and is a powerful excavator and disintegrator. During the floods, about eight million cubic yards of earth, in the form of silt, are carried away by it in twenty-four hours. Geologically, this may be very satisfactory; but it is to be regretted that such immense power cannot be employed more usefully. Could this rate of excavation be attained in making the Manchester Ship Canal, for instance, it would occupy but a week to do the work that has taken 10,000 men and 100 steam navvies many years to accomplish.

On both sides of the river the railway company had to construct some miles of approaches to their new bridge, and for these, surveys and estimates were made, but no soundings and borings were taken across the river, along the line of the bridge, because the authorities hesitated to incur the expense of the necessary appliances for doing such work, it not having been absolutely decided at that time to carry out the scheme. When the railway company made up their mind to proceed with the work everything had to be done in the least possible time, and soundings that had been made in 1881 were accepted as being correct, and, upon this information, the contracts for making the bridge and approaches were let. The work being now commenced, it was thought expedient to employ a professional man to make new soundings and borings, and it was not long before it was discovered that those formerly made, and upon which the designs had been based, were so inaccurate that it would be necessary to suspend work. When the new soundings were completed, they indicated the position of the rock to be such as shown by the line marked "supposed rock, 1888," in the above diagram. The first design for the bridge was consequently modified to suit this new condition of affairs; the cantilever system was adopted, it being thought that the east pier would only have to be sunk to a moderate depth before it reached the bed rock. The work was, therefore, again started, and pushed on with the greatest speed. In three months the approach lines were finished, the two west piers were completely built, and most of the stone prepared for the east pier. A considerable portion of the superstructure, which was being prepared by the Phœnix Iron Company, was also constructed in their shops. The work was in this condition when the caisson for the east pier was ready to be sunk. The sinking progressed satisfactorily until a depth of 10 ft. had been reached, and it was then discovered that what was originally thought to be bed rock was only a compact boulder bed, 3 ft. to 4 ft. thick, portions of which could be penetrated by the drill. Below this bed sand and gravel were met with, until, at a depth of 64 ft., the solid rock was reached. It was at once evident that a stronger caisson, sunk to a much greater depth, would be required if a pier was to be made in this position, and the work on the superstructure was, therefore, again stopped to allow the whole scheme to be reconsidered. When it became

known what a large amount of work had been done by the Phœnix Iron Company in connexion with the steel-work, it was thought desirable to make no change in the designs they had been working to, but to carry out the cantilever system, as previously settled upon. The total cost of the bridge, without the approach lines, is stated to have been 92,500*l.*, and one item of this expenditure is 1,600*l.* for the soundings and borings. Had these few hundreds been spent at the proper time, they would most probably have saved the company as many thousands.

In dealing with the superstructure we must remember that the cantilevers were originally proportioned in accordance with information concerning the foundations which was afterwards found to be incorrect. If the bed of the river had been as indicated by the line marked "supposed rock, 1888," in the above diagram, there is no doubt that the positions of the piers were fixed with a due regard to economy, although the centre span is somewhat long. The arms of each cantilever are 165 ft. long, which gives a central span of 330 ft., or one-half of the total span. It was stated by Mr. Robinson in his paper that if this span had been reduced to 275 ft., the saving in the total amount of metal required for the superstructure would only have been about 1½ per cent. The distance between the trusses is 25 ft., or one-twenty-seventh of the span, and it has been shown that this proportion gives the same lateral stiffness to a cantilever bridge that is obtained in a single truss bridge where the girders are placed one-eighteenth of the span apart. Greater stability could have been given to the structure by increasing the width between the lower trusses at the piers, while retaining the 25 ft. width at the ends of the cantilevers; but this method was objected to because of the extra work it would cause in the shops, and also because it would necessitate a tie of considerable section being placed between the trusses at the piers, which, when altering its length, due to temperature, would tend to split the masonry. Where the anchor arms of a cantilever bridge are particularly short, the weight of the structure between the piers may be sufficient to overbalance the combined live and dead loads on the shore arms. This is the case with the Red Rock Bridge, and consequently no alterations in the stresses from compression to tension, or *vice-versâ*, can occur in any member of the shore arms.




The material used throughout the structure, except for a few minor parts, is open hearth steel, having a quality almost identical with that adopted for the Forth Bridge.

In building the superstructure at the site, the shore arms had, of course, to be first erected on staging, and when these were finished and anchored down the cantilevers on the river side were built out. The central girders were built by overhang in the same way, until the two halves of each met at a point half way between the piers.

The bridge was completed on June 25, 1891, about twenty months after it was commenced. A considerable portion of this time was lost through the information regarding the nature of the bed of the river being inaccurate, as above alluded to. What extra expense the company was put to from this cause, it is impossible to say, but the amount must have been very large, and those who are responsible for similar undertakings would do well to remember that it is not economical to unduly cut down preliminary expenses, and that it is possible to delay the completion of such works by hurrying too much.

## THE ROYAL SOUTH LONDON OPHTHALMIC HOSPITAL.

This new building, which, as we mentioned last week, was recently visited by the Architectural Association, has been in course of erection for the past three years. It is now approaching completion, and has already been opened for out-patients. The building occupies the whole site of the old hospital and that of some adjoining property which was acquired. The whole frontage is about 174 ft. in length, partly towards St. George's-circus, and partly towards the open space at the junction of Waterloo and Westminster Bridge-roads. The site is thus a commanding one, with abundance of light and air, and it may be said to occupy one of the best possible sites for such a hospital, where the out-patients largely predominate, for it is computed that no fewer than 4,000 public vehicles,—omnibuses, tramcars, &c.,—going to almost all parts of London north and south of the Thames, pass the Obelisk in the centre of St. George's-circus every day. The old frontage-line has been set back, so that there is a pavement 22 ft. wide towards St. George's-circus,—a very desirable thing in the interests of the large number of blind or nearly blind out-patients who will use it daily. The building consists of a half-basement, ground floor, and four floors above, with a flat roof on top having an area of about 4,000 ft. super., covered with Claridge's Seyssel asphalte, and a very airy promenade and recreation-ground it will form at certain times of the year for the staff and some of the in-patients.

The half-basement is principally devoted to the purposes of a large and well-lighted, warmed, and ventilated waiting-hall for the out-patients, having a separate entrance in the Waterloo-road. From this waiting-hall, which is provided with sanitary conveniences for both sexes, the patients will ascend by a staircase direct to the surgeons' examination and consulting rooms on the ground-floor, and thence will pass into a corridor to the "refractory" or spectacle-room, and thence past the dispensary (where they will get their medicines or lotions) direct into the street by a separate exit, so that patients coming in and going out will not meet each other. The ground floor also includes ophthalmoscope-rooms, bandaging-rooms, dark-rooms, and offices for the staff. There is also an isolation-room and an office for the Secretary closely adjoining the main entrance. The entrance-porch and staff entrance face towards Westminster Bridge-road, and consist of a flight of steps within a recessed archway closed by a Bostwick folding gate. The porch is lined with chocolate and pale-green glazed bricks, of special make, supplied by Messrs. Cliff & Son, of New Wortley.

A notable feature of the arrangement of the building is the devotion of a portion of the ground floor at the Waterloo-road end of the frontage (with a mezzanine floor above) to the purposes of a coffee-tavern or temperance estaurant, so that the poor patients, many of

whom come long distances, will be able to get a cup of tea or other light refreshment at a cheap rate. This will be quite distinct from the hospital, however, and will have to be entered from the street. It will not be under the management of the committee of the hospital, though possibly conditions as to the quality and price of the refreshments will be imposed upon the tenant.

The first-floor is occupied partly by rooms for paying patients, and partly by apartments for the resident surgeon and for the matron. The second and third floors are chiefly devoted to in-patients' wards, with a few private rooms for paying patients. The wards contain seven or eight beds each. The fourth floor is occupied by the kitchen and other domestic offices, and by bedrooms for the servants of the hospital.

There are some noteworthy points about the planning of the hospital. The staircase, for instance, is semi-circular on plan, and is 5 ft. wide, this width, however, being divided into two by a double handrail in the centre, supported on standards, into an up and a down road, with the risers and treads of each differently arranged. There is a separate handrail on each of the wall-sides of the staircase, which has been specially designed for the use of blind or half-blind patients. The water-closets, &c., are built in projecting blocks on each side of the staircase, and are cut off from the main building by cross-ventilated lobbies. In the construction of these blocks of conveniences, iron stancheons and girders are used as framing and support for the brick enclosing walls. Near these, and also external to the building, is a lift, by Messrs Archibald Smith & Stevens, going up to the top floor. Another point worth note is that there are no square corners or angles in the whole building, the corners of rooms and projections being rounded off, as well as the junctions of walls with ceilings and floors. The building is throughout of fireproof construction, and will be fitted with the electric light. An interesting feature of the arrangements is a system of telephonic and electric communication from all parts of the building, even from the bedside of each patient, to a small lobby where an attendant is always on duty. Mr. Julius Sax fitted up these appliances.

The architect of the building is Mr. Keith D. Young, the general contractor being Mr. William Downs, of Hampton-street, Walworth-road. The red facing bricks of the façade were supplied by Messrs. Lawrence & Sons, Bracknell, and the moulded red bricks in all window dressings, string-courses, and cornices were specially made, to the architect's designs, by Mr. James Brown, of Cannon-street. The terra-cotta was modelled to the architect's designs by Mr. J. C. Edwards, of Ruabon. The whole of the glazed bricks were supplied by Messrs. Cliff & Son. The terra-cotta air-extraction shafts from each room, and the drain-pipes, were made and supplied by Messrs. Doulton & Co. The whole of the plumbing and sanitary fittings are by Messrs. Dent & Hellyer. Messrs. James Slater & Co., of High Holborn, were the contractors for the boilers and heating apparatus, the entire building, in every room, being heated by hot-water coils. The same firm also fitted up the kitchen and scullery with gas-cooking apparatus. The whole of the structural ironwork is by Messrs. W. H. Lindsay, Neal, & Co., of Paddington. Mr. T. Elsley supplied and fixed the gun-metal casements. Messrs. Richardson, Ellson, & Co., supplied the tradesmen's entrance-gate and wrought-iron grilles; Messrs. Murrell, of Chelsea, the wrought-iron screen-gate to out-patients' entrance, exit turnstile, and wrought-iron handrailing; Messrs. Hayward Bros. & Eckstein the pavement and roof-lights; Mr. J. Gibbons the locks; and Messrs. Hart, Son, Peard, & Co. the general ironmongery. The damp-course work and the floor of out-patients' waiting-hall were executed by Messrs. Pilkington; the *terrazzo* floors by Messrs. Burke & Co.; the parquet floors to public and private wards by Messrs. Turpin & Co.; the slate work for ophthalmoscope rooms, baths, &c., by Messrs. Robert Holland & Co; the dispensary fittings by Messrs. Hawke; the gas-fittings by Mr. Biggs; and the glazing by Messrs. Clark & Sons. The clerk of the works is Mr. H. J. Heathe, to whom, and to Professor McHardy, we must express our thanks for having been shown over the building. Professor McHardy has been the life and soul of the work, and to him are due many details of the hospital. We congratulate him on the near completion of his arduous work.

Old Houses on the south side of Great St. Helens, Bishopsgate (attributed to Inigo Jones) now about to be demolished.

Two panels on pilasters in centre of front.

## OLD HOUSES, BISHOPSGATE.

We give a sketch of the houses generally supposed to have been designed by Inigo Jones, which form a part of the south side of Great St. Helens, Bishopsgate, and which are about to be removed. They are of brick, with bands on the pilasters, caps and bases in stone. The wall-jambs, and window-heads are rusticated, and a bold cornice projects over the first-floor window. The original finish, probably a deep cornice carrying the eaves, has been destroyed, and a more modern window-storey built in its place. There are one or two fireplaces and a staircase, which we understand are going to be preserved.

In his "Illustrated Itinerary of the Ward of Bishopsgate," 1862, the Rev. Thomas Hugo, F.S.A., refers to the house in Bishopsgate-street Within named "Crosby Hall Chambers," and says:—

"The front towards the street has lost all its ancient peculiarities, except two beautiful festoons of flowers inserted between the windows of the first and second floors."

He then goes on to say:—

"The north front, which faces an inside court, is very remarkable. The base is composed of rustic work, and the wall above is relieved with pilasters and capitals. The whole of this front is another pleasant specimen of the graceful ease with which the genius of Inigo Jones, for to him I attribute it, could invest ordinary objects with an air of essential beauty. . . . . In a room behind the front last described is a chimney-piece which bears the date 1633, and is a gorgeous specimen of English ornamental work of the earlier half of the seventeenth century."

Mr. Hugo, whose book we cite, as well as his "Last Ten Years of the Priory of St. Helen's" (1865), which we commend to the perusal of our readers, mentions other work in this neighbourhood as by, or reputedly by, Inigo Jones, such as the south entrance to St. Helen's Church, bearing date "1633" and Nos. 11 and 12 in Great St. Helen's, a red-brick house with pilasters of the same material, though the doorways have a somewhat later character (this building must not be confused with Nos. 8 and 9, supposed to be Sir John Lawrence's, and bearing date "1646"). Crosby-square was built in 1677, over that part of Crosby-place that had been burnt in the previous year; between the square and Crosby Hall Chambers lies a pleasant little garden, whose whereabouts Mr. Besant is fearful to find disclosed.

## THE SEWAGE FARMS OF BERLIN:

### INSTITUTION OF CIVIL ENGINEERS.

At the eighteenth ordinary meeting of this Institution for the present Session, held on the 5th inst., the President, Mr. George Berkley, in the chair, the paper read was on "The Sewage-Farms of Berlin," by Mr. Herman Alfred Roechling, Assoc.M.Inst.C.E.

Berlin is situated in the sandy plains of North Germany, on both sides of the River Spree, which empties itself into the Havel, at the town of Spandau, about 5½ miles below the city. The Havel is a tributary of the Elbe, and forms a succession of lakes immediately above and below the junction with the Spree, which are picturesque in places, and are a favourite holiday resort of the population. The flow of water in the Havel and in the Spree is very sluggish, and the latter river, in periods of great drought, discharges only about 460 cubic feet per second. The area of the city is about 24½ square miles, and its population at the last census (December 1, 1890) was 1,578,794. The density varies from 220 to 25 persons per acre, each dwelling-house (flat system) being inhabited by an average of sixty-five people. There are about 250 miles of streets, 80 miles of brick sewers, 285 miles of stone-ware pipe sewers, and 55½ miles of pumping mains to the sewage-farms. The Waterworks were purchased (from an English company) by the city authorities in 1874, and the authorities also established their own gasworks, as they could not come to terms with the "Imperial Continental Gas Association." The city provides for its extraordinary expenditure by the issue of loans, the last loan, that of 1886, 2,500,000*l.*, was issued above par (101·18); this is an excellent indication of the credit it enjoys in the money market.

After the Franco-German War, Berlin became the German metropolis. Since then it has grown rapidly, and the changes it has undergone have been very marked. Whole districts have been cleared of their old insanitary houses, new streets have been formed, and others have been widened. Many new and elegant buildings have sprung up, the old, abominably-smelling street-gutters, which were practically open sewage-carriers, have disappeared, and under the sway of an intelligent and enterprising City Council, which is the sole municipal authority, Berlin has become one of the finest and best managed cities in the world. It was originally intended to drain the city in the ordinary way by two main intercepting sewers,

one on each side of the river, with one common pumping station, and to discharge the sewage, after some slight treatment, into the Spree. A scheme was prepared on these lines in 1861, but it was not accepted, and finally, after numerous experiments respecting the best mode of sewage disposal had been made, the City Council decided to employ sewage-irrigation, and Mr. Hobrecht's new plan for the main drainage of the town was adopted in March, 1873. The works were commenced in August of the same year, and they have been in hand ever since. Under Mr. Hobrecht's scheme the whole area of the town is divided into twelve separate drainage areas, called "radial systems," which are entirely independent one of the other. They have each a pumping station, from which the sewage is raised direct on to the farms, two drainage-districts being in some cases united to one rising-main. The area of these radial systems varies from about 674 acres to 2,117 acres, the total population in such of them as are entirely built over being about 200,000.

The authorities have purchased the whole of the land required for sewage-farming; some of this land lies in the north and north-east, about six miles from the city, and some in the south about twelve miles distant from it. The total area of all the farms has now reached 18,790 acres, of which at present only 11,016 acres are under sewage-treatment; the remainder is, however, being prepared for sewage-farming, and the acreage of the farms is extended as circumstances require. The sub-soil on the farms is, generally speaking, sand, with a preponderance of sandy loam in places, especially on the northern farms, and is well suited for sewage-irrigation. The land is practically level, with small eminences here and there. The sewage of about 112 persons is now treated on each acre of land.

The distribution of the sewage takes place by means of underground cast-iron pipes, which start from the stand-pipes on the rising-mains and terminate on the small summits, where the open earth carriers commence. The whole of the land that receives sewage has been specially prepared for irrigation by levelling and draining. The effluent from the farms is conveyed in open ditches into small streams, which empty into the River Spree, partly above, partly in the city, and partly below it.

The authorities employ a large number of "misdemeanants" in the work on the farms; these are men who have been sentenced for various minor offences to undergo a period of confinement in the House of Correction; they are the loafers of the Berlin streets. From a philanthropic point of view, this course cannot be too highly commended, as it gives the men a chance to get back into regular habits and thus to redeem their character.

The city has spent about 2,906,792*l.* in works of sewerage, and 1,173 648*l.* in the sewage-farms, and about 350,000,000 tons of sewage have been utilised on the farms since the commencement of irrigation. Broadly speaking, the largest acreage in 1889-90 was under cereals, viz., 2,817 acres, then follow the grass plots with 1,785 acres, the roots and green vegetables take the third place with 1,013 acres, and oil-producing plants are cultivated only on 237 acres. There has been a very fair profit on the management of the farms since 1886, but, of course, the amount has not been sufficient to meet the payments for capital expenditure. The deficiency, however, is not a large one, as it has necessitated only an average annual rate of 0·89d. in the £ during the last five years, or a payment of 7·11d. per head of the population per annum. This is a remarkably small amount, and compares favourably with what has been paid in England for sewage-utilisation.

The degree of purification attained has been excellent, as on an average from 95 to 98 per cent. of the organic ammonia contained in the sewage has been abstracted on the farms. This is considerably above the figures quoted by the Rivers Pollution Commissioners as the result of sewage-farming in this country. The farms have had no ill-effect upon the health of the population living on them, and the prejudice against them has almost died out, which is evidenced by the ever-increasing demand for sewage by adjacent farmers and landowners.

On the whole, Berlin is to be congratulated upon the cheap and efficient way in which it utilises the sewage. Where other towns have failed it has succeeded, and that upon a scale at present without a parallel.

## *ARCHITECTURAL SOCIETIES.*

THE ARCHITECTURAL ASSOCIATION (LONDON).—The tenth meeting of the discussion section (late advanced Class of Construction and Practice) was held at the rooms of the Association, on the 6th inst., when Mr. Francis R. Taylor read a paper on "Science applied to Architecture." Mr. Henry Adams, M.Inst.C.E., attended as special Visitor. The paper, which was illustrated by the limelight lantern, was, of course, merely a sketch of this big subject, but was very interesting, and created a good discussion. Votes of thanks were passed to Mr. Taylor and to Mr. Adams for the useful information which they had brought before the class.

EDINBURGH ARCHITECTURAL ASSOCIATION.—At a meeting of the Edinburgh Architectural Association held at 42, George-street on the 7th inst., Mr. Hippolyte Blanc presiding, Mr. A. H. Millar, of Dundee, read a paper on "The Hie Gait and Sautmercat of Glasgow in the Olden Time." Mr. Millar said his purpose was to apply the analytical process and show why Glasgow had taken its present form. There were various theories to account for the present form of the city, but he would confine his attention to the most reasonable of them. The nucleus of the city was the Cathedral, which was built on the side of a hill, around which the houses of the ecclesiastics had been planted. The extremity was the river Clyde, and here had been the colonies of salmon fishers. With the passing and repassing of the ecclesiastics on an errand for fish, and of the fishers for the ministrations at the Cathedral, a footpath would be gradually formed. The footpath would soon become a beaten track, and develop into a road. Artificers, &c., settled in the place, and they also chose the side of the river. There was no trace of the name Sautmercat until about 1600. The name would be given to the place at the Cross round which the salt sellers took their place. There were also lateral extensions by Drygait and Rottenrow, and by Gallowgait and Trongait. Such was the skeleton of the city. The people wended their way on solemn occasions either to the Cathedral or to the other chapels, and the footpaths through the fields had determined the form and fashion of the great city of Glasgow.—About forty members of the Association paid a visit on the 9th inst. to Yester House and the old Castle of Yester, near Gifford. They were received by the Marquis and Marchioness of Tweeddale, by whom they were entertained. Mr. Thomas Bonar. the leader of the party, explained that very little was known of the early history of the old feudal tower, which dated back as far as 1267. Notwithstanding its great antiquity, there still remained evidence enough to show that it must have been a very powerful stronghold, and a castle of the very first importance for the defence of the surrounding district. Tradition had it that it was the last castle that stood out against Cromwell's troops. After that date it fell completely into disuse and decay, owing not only to the effect of time, but to the removal of its stones for building operations by the people of the locality. After discussing at some length its architectural features, Mr. Bonar mentioned that the Castle came into possession of the present family some time in the fourteenth century. The character of the architecture of Yester House was known as Scottish Classic, and resembled such houses as Arniston, Airth, Drum, and others. The building dated from 1740-46.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held on the 5th inst., the President, Mr. Alexander M'Gibbon, in the chair, when a paper on "Early Irish Architecture" was read by Mr. Charles E. Whitelaw. The Irish examples of pre-Anglo-Norman building were, he said, specially valuable, as of that period England had but a meagre collection. The diminutive size and austere simplicity of the Celtic oratories was to be attributed as much to veneration for some prototype as to poverty and social rudeness. St. Patrick formulated a model, whose dimensions very nearly approached those of the Greek churches of somewhat similar date. Cormac's Chapel, 1127, was about the earliest example of true Norman, in most points similar to English usage, excepting the chancels, that continued to be constructed with square east end rather than semi-circular or polygonal. The round towers were not now considered to date earlier than the ninth century. They range from 50 ft. to 150 ft. in height, and from 40 ft. to 60 ft. in diameter at the base, and have from four to eight stories. Their purpose was undoubtedly for the secure storage of valuables. Mr. Whitelaw showed drawings of Celtic ornament and moulding of features, such as doors and windows, and photographic views. The discussion which followed was opened by Mr. Blane, and at its close the customary vote of thanks was awarded the essayist.

## BRITISH ARCHÆOLOGICAL ASSOCIATION.

AT the meeting of this Association on Wednesday, April 6, Mr. C. H. Compton in the chair, it was announced that H.R.H. the Prince of Wales had consented to act as one of the patrons of the Congress of the Association, to be held at Cardiff in August next. Some antiquities recently found at Peterborough and Sibson were exhibited by Mr. Bodger. Among these were some interesting Roman coins, and a Saxon comb, found at a great depth beneath one of the roadways of Peterborough. Mr. Wood exhibited an impression of the sixteenth century seal of the town of Sudbury, Suffolk. Mr. De Gray Birch, F.S.A., sent for exhibition a series of impressions from the seals of Boxley Abbey, Kent, cleverly restored by Mr. Ready. A paper was then read by the Rev. J. Cave Browne, on the seals of Boxley Abbey, all the known examples being referred to and described. On one of the most elaborate of the examples, the heads of St. Benedict and St. Bernard appear within small quatrefoils, placed central upon the shafts of elaborate tabernacle work, while a branch of box in reference to the name, appears on one side. Box still grows on the neighbouring chalk hills, close to the site of the Abbey. Mr. Loftus Brock, F.S.A., described the present condition of the remains of the conventual buildings. The second paper was on the discovery of a Roman hypocaust at Chester. It has been met with in erecting new business premises for Mr. Sykes, who, with praiseworthy regard for the preservation of the remains, has had the work altered to allow of this. The hypocaust, which is in Northgate-street, consists of a large number of square pillars, worked in red sandstone, in excellent preservation. The meeting concluded by the passing of votes of thanks to the author of the paper, and to Mr. Sykes for arranging for the preservation of the remains, so far as they exist on his property.

## THE LONDON COUNTY COUNCIL.

THE last meeting of this Council before the Easter holidays was held on Tuesday afternoon last at Spring-gardens, the Vice-Chairman, Mr. John Hutton, presiding.

*Payments to Contractors During the Recess.*—The Finance Committee's report contained the following paragraphs and recommendation:—

"We have had under consideration the question of making the necessary provision to meet payments to contractors during a recess. At the last Christmas recess, nineteen cheques were drawn, of which six had to be cancelled as not required, and in the interval between the last Council going out of office and the election of the present Council, of the forty-six cheques drawn nineteen were cancelled. With a view of preventing so large a number of cheques being drawn and cancelled, we suggest the adoption of a different course of procedure, as also to meet the difficulty of a contractor, who, although entitled to some payment, but not having done a sufficient quantity of work to cover the cheques drawn, is unable to obtain an advance which he is, under the contract, entitled to on obtaining the certificate of the certifying officer concerned. The only payments likely to be required in the Easter recess are for Mr. Gabbutt, the contractor for Claybury Asylum, 15,000*l.*, and Mr. Hine, the architect, 450*l.*

It is proposed (1) that the Council should authorise the Treasurer to pay the contractor such sums as will be mentioned on certificates signed by the architect, and countersigned by a member of the Council, not exceeding in all (in the present case) the sum of 15,000*l.* and 450*l.*; the Treasurer to take receipts only on forms vouched by the Cashier or other authorised officer in the Comptroller's department. (2) That the certifying officer should have a book of forms of certificate which he would fill up as required, and send, when signed, to the Cashier, who would then obtain the counter signature of the appointed member of the Council, and issue it with the form of receipt to the contractor, who would convey it to the Treasurer and obtain payment. (3) That the Treasurer do receive from the Council, before the recess, orders

in favour of certain contractors, and record on each order every payment made on account of that order.

We propose to try this as an experiment for the ensuing Easter recess, so that if found satisfactory it may be brought into general use for all similar occasions. We recommend—

'That the Treasurer be authorised, upon a certificate or certificates of Mr. G. T. Hine (architect), and countersigned by a member of the Council appointed by the Finance Committee, to pay the sums mentioned therein not exceeding the following amounts—Mr. Edmund Gabbutt, for erection of Claybury Asylum, 15,000*l.*; Mr. G. T. Hine, architect, commission at 3 per cent., 450*l.*'"

The recommendation was agreed to without discussion.

*Proposed Public Buildings at Battersea.*—The Finance Committee also reported as follows concerning an application for a loan by the Vestry of Battersea:—

"We have considered the application of the Vestry of Battersea for the loan of 35,000*l.*, to purchase a site and erect new parochial offices, repayable in 50 years.

The property purchased by the Vestry is situated between Lavender-hill, Eland-road, and Elsley-road, and has a frontage of 163 ft. to Lavender-hill and extends to a depth of 650 ft. Included in the purchase are two houses in Eland-road, which, being part of the same property, the Vestry state that they were compelled to purchase. The price paid for the whole is 8,450*l.*, which the Council's Valuer considers reasonable, and the Vestry apportion on the site for the Vestry offices the sum of 6,000*l.*

The Vestry offices will be provided in the building to be placed on the front portion of the site, and these offices include accommodation for the holding of inquests, approached by a separate staircase. In the rear it is proposed to erect a large hall 98 ft. by 55 ft. 3 in., with a reception-room and a small hall 55 ft. 6 in. by 38 ft. 6 in. underneath this, together with retiring-rooms and the conveniences incidental to such a structure as might be let or used for public meetings, entertainments, &c.

We caused to be notified to the Vestry the fact that there were legal difficulties which prevented our recommending the Council to consent to the loan as applied for, as no authority had been obtained to raise money for the erection of the large halls or coroner's court, and we have since received an explanatory communication from the Vestry and seen a deputation on the subject, and our objections not having been removed, we are unable at present to recommend any advance for these purposes.

The Council's Architect has examined the drawings and specification for the proposed buildings, and apportions the cost as follows: Vestry buildings proper (15,200*l.*), professional and incidental charges (1,300*l.*), and fittings and fixtures (3,000*l.*), making 19,500*l.* Coroner's court and professional charges, 1,400*l.*, and the public halls 10,000*l.*, making a total upon the buildings of 30,900*l.*

The amount which we consider may be now advanced is 19,500*l.* (15,200*l.* and 1,300*l.* and 3,000*l.*) for Vestry offices, and 6,000*l.* for the land, and we accordingly recommend—

'That, subject to the Council hereafter giving its written consent under seal to the borrowing, and subject to all necessary consents and evidence being furnished to the satisfaction of the Solicitor of the Council, the application of the Vestry of Battersea for a loan of 35,000*l.*, to defray the cost of purchasing a site and erecting Vestry offices, be granted to the extent of 25,500*l.*, on condition that the loan is taken up at once, interest being charged thereon at the rate of 3*l.* 10s. per cent. per annum, calculated quarterly, and with the principal being repaid by such equal half-yearly payments of principal and interest combined as will repay the amount borrowed as to 6 000*l.* for site within a period of 57 years, as to 16,500*l.* for buildings within 30 years, and as to 3 000*l.* for fittings within 15 years; that it be referred to the Solicitor to take the necessary measures for completing the loan, and that the amount be advanced out of the Consolidated Loans Fund.'"

This led to some discussion, on an amendment moved by Mr. Costelloe, to the effect that the recommendation be referred back to the Committee. He expressed the opinion that, for the purpose specified, a larger loan should be made. It was, he said, very desirable that facilities should be granted for the erection of public halls.

Mr. Harben seconded the amendment.

Mr. Evan Spicer (Chairman of the Finance Committee) said they had taken legal opinion, with the result that, though they regretted the circumstances, they did not feel justified in recommending that a larger loan should be made.

Mr. Westacott said they should endeavour to get the law altered rather than go beyond their present powers.

Mr. Spicer suggested that they should pass the present recommendation, and later on consider a separate application in reference to the halls, &c.

Mr. Costelloe, in view of Mr. Spicer's suggestion, withdrew his amendment.

Mr. Cohen next moved to omit the words "and interest combined."

Mr. Fardell seconded the amendment, which was lost by a large majority. The recommendation was then agreed to.

*The Annual Estimates: Grants in Aid of Technical Education.*—Mr. Evan Spicer, Chairman of the Finance Committee, next brought up and explained the estimates of the Council's receipts and expenditure for the year ending March 31, 1893. He explained that the total sum required to be raised during the year would be 1,696,034*l.*, of which 1,403,688*l.* would be on the General County Account, and 292,346*l.* on Special County Account. This sum total was the difference between the estimated total expenditure for the year (2,959,330*l.*) and the estimated total receipts (1,263,296*l.*) from all sources other than the rates. This would necessitate a rate of 10·1d. in the pound on General County Account, and of 2·4d. in the pound on Special County Account, making a total rate, outside the City, of 12½d., as compared with 11¾d. in 1891-92, or an increase of ¾d. in the pound. Mr. Spicer concluded a long explanatory statement by moving a series of resolutions, of which the first was as follows:—

"That the estimates now before the Council, of the receipts and expenses of the Council for the year ending March 31, 1893, be approved, and that the Council do hereby estimate the amount that will be required to be raised in the first six months and in the second six months of the said year by means of contributions, to be as follows:—

| | In the first six months. | In the second six months. | Total. |
|---|---|---|---|
| General County Account .... | £701,844 .. | £701,844 .. | £1,403,688 |
| Special County Account .... | 146,173 .. | 146,173 .. | 292,346 |
| | £848,017 | £848,017 | £1,696,034 " |

On this recommendation, Mr. Quintin Hogg moved, as an amendment:—

Provided that 30,000*l.*, being part of the amount receivable by the Council under the Local Taxation (Customs and Excise Duties) Act, 1890, be carried over to a suspense account, instead of being applied in reduction of rate, and that such 30,000*l.* when carried over, be dealt with on or before October 1 next, by the Council for any purpose authorised by the above Act; and that a special committee be appointed to consider what action the Council should take under the Technical Education Acts 1889-91, and the Local Taxation (Customs and Excise Duties) Act, 1890, with power to draw up a scheme or schemes for the consideration of the Council."

Mr. Hogg said he moved this amendment because he saw with regret that the Finance Committee proposed to follow the course adopted by the last Council, and to devote no portion of the money coming to them from the Imperial Exchequer to the promotion of technical education. It was clearly the implied, if not the expressed, intention of the Legislature that the London County Council should devote part of the money thus accruing to it to the cause of technical education, as other County Councils had done, instead of applying it to the relief of the general rate. He contended that to help on the cause of technical education was one of the surest ways of relieving the rates, for our workmen would become better skilled in their various trades and able to cope more succesfully with foreign competitors.

Mr. Baum, as a representative of the skilled artisans in the metropolis, said he was pleased to second the amendment. He thought the matter should not be met by charitable doles, but by some systematic scheme of technical instruction all over London, of which every child might take advantage.

Colonel Hughes, M.P., thought it rather a reproach to the Council that they had not looked at the matter of technical education with sufficient earnestness up to this moment. He supported the amendment.

Mr. Charles Harrison opposed the amendment, and pointed out that by an Act of Parliament the Council were empowered to impose a rate not exceeding a penny in the pound for the purposes of technical education, but he doubted whether there was a single councillor who would propose the increase of the rates to that extent for that object. In his opinion it was premature for the Council to apply funds over which they had absolute discretion in that way, as it was inexpedient to relieve the pressure which otherwise existed on the City Guilds to provide and have their moneys applied for technical education and for works of public utility within the meaning of the report of the Royal Commission on the City Guilds.

Mr. Sydney Webb supported the amendment.

Sir Thomas Farrer said it appeared to him that the County Council were not in default on this question, as Mr. Goschen had suggested in his Budget speech. Mr. Goschen showed distinctly in 1871 that the persons who needed assistance in the matter of rates were the towns, and especially the metropolis. When they came too look at the way in which the Exchequer contribution was distributed, they found that the towns, and London especially, had not received anything like their fair share of that contribution.

Dr. Collins supported the amendment, because he believed that at the present time the question of technical education in the metropolis was one which was ripening for solution.

Mr. Doubleday also approved the amendment, as he considered it would provide the quickest way of getting at the funds in the hands of the City Guilds.

Mr. Pickersgill, M.P., oppposed the amendment, although he admitted that, by the action of the Science and Art Department in curtailing or withdrawing grants to technical schools, on the assumption that all the County Councils would help on the cause of technical education, certain institutions in London would suffer great hardship, and their work would be seriously crippled.

Sir John Lubbock said that as treasurer of the Technical Education Association, perhaps he might be allowed to say a few words. The amendment had been appropriately moved by Mr. Quintin Hogg, who had done so much for the technical instruction of London. It was fortunate indeed for London that Mr. Hogg had not himself acted on the advice of Mr. Harrison. The opponents did not deny the importance of technical education, and if we wished to maintain our supremacy in commerce and manufactures we must give our people the same advantages as they enjoyed elsewhere. Other counties and cities had applied their funds to technical education, and he hoped London would not remain behind. It was said that the Council was not the proper body, but Parliament had decided that for them. He trusted that the Council would support Mr. Hogg; for if, on the contrary, they rejected the proposal, it would be a great discouragement to the cause of education throughout the whole country.

Mr. Torr claimed that the money of the City Guilds belonged to the ratepayers, and ought no longer to be wasted in feasting. The Council ought to have it, so that they might as soon as possible set to work to establish seriously technical education in London.

After some further discussion, the amendment was adopted, on a show of hands, by a large majority.

Mr. Arthur Arnold next moved to amend the amendment by omitting all words between "that," in line 1, and "a special committee," towards the latter part of the amendment, so as to confine it to the question of the appointment of a committee, without setting aside or tying up 30,000*l.* or any other sum.

This amendment was seconded by Mr. Hubbard, but was defeated, on a division, by 64 votes against to 39 for,—a majority of 25 against the amendment.

Major Probyn next moved, and Mr. Emden seconded, as a further amendment:—"That it be referred to the General Purposes Committee to report as to the desirability of devoting at least 100,000*l.*, derived from the Customs and Excise duties, for the purposes of technical education." The amendment was immediately negatived, and the recommendation of the Finance Committee, as amended by Mr. Hogg's addition, was approved.

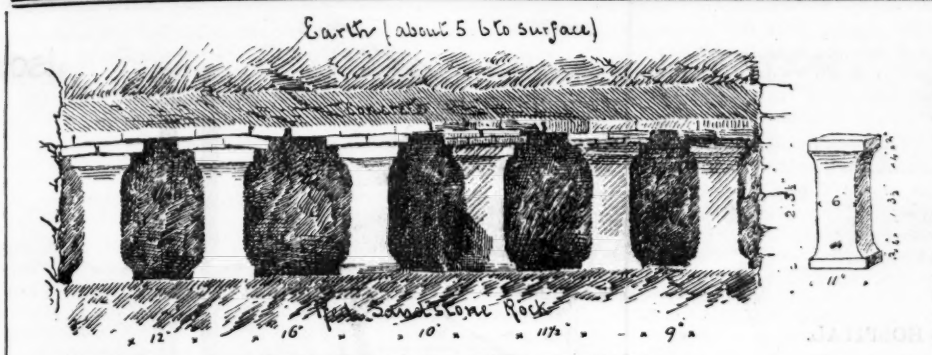
The other recommendations, which were of a formal nature, were then agreed to without discussion.

*The Limit of Height of Buildings, whether on old or new Foundations.*—The Public Health and Housing Committee's report contained the following:—

"The Council, on the 8th December last passed the following resolution—

'That it be referred to the Building Act Committee to consider and report whether, with a view to preventing the increase of insanitary areas in London, it is desirable that effect should be given to the recommendations made in 1885 by the Royal Commissioners on the Housing of the Working Classes, with regard to limiting the height of dwelling-houses according to the space about them, whether built on old or new foundations, and what amendments of the Building Acts are practicable in this direction.'

Shortly after the passing of this resolution, the Building Act Committee reported to the Council the amendments which they suggested were required to the Metropolitan Building Acts, which are now the subject of a Consolidation Bill. The amendments




*Remains of Roman Hypocaust, Chester.*

then suggested included one framed on the principle of a rule prevailing in Liverpool for securing an open space in the rear of all buildings, whether built on old or new foundations, based on an angle of 45 deg., and such an alteration in the law would undoubtedly greatly assist in preventing the creation of slums in the future. It does not, however, go to the length to which your Committee would wish to see an alteration in the law, as it does not deal at all with the air space in front of the building.

Again and again cases have come to our notice, either by complaints from local authorities or private individuals or otherwise, in which it is proposed to erect buildings on old foundations, which from lack of air space would inevitably be insanitary; and beyond warning the builders that proceedings may be taken when the houses are erected to obtain their closing and demolition, perhaps at the cost of the ratepayers, no action has been possible owing to the defective state of the existing law. Any efforts of the Council to abolish narrow and unhealthy courts and yards are constantly frustrated by the fact that the law permits the erection of dwellings of any height so long as they are on old foundations, and we consider that steps should be taken with a view to the insertion of a clause in the Building Acts Amendment Bill dealing fully with this important question. We therefore recommend:—

'That the Council do pass the following resolution That, in the opinion of the Council, it is desirable that a clause should be introduced into the London Building Law (Consolidation) Bill controlling the height of buildings, whether built on old or new foundations, in relation to the street or open space in front of them, and that it be referred to the Parliamentary Committee to give effect to this resolution.'"

Dr. Longstaff, Chairman of the Building Act Committee, objected to the action of the Public Health and Housing Committee in this matter, and opposed the adoption of the report, the consideration of which was adjourned.

After transacting other business, the Council adjourned until Tuesday, May 3.

## REMAINS OF ROMAN HYPOCAUST, CHESTER.

WE give a drawing of the remains of a Roman Hypocaust recently discovered behind Northgate-street, Chester. The pillars, of red sandstone, rest on the sandstone rock; the tiles forming the roof vary from 1½ in. to 2½ in. in thickness by about 10 in. on the face; the concrete is about 6 in. deep.

The section shows part of two rows of columns,—the three to the right are 18 in. behind the others. We give in the margin the dimensions of a pillar which has been removed for preservation.

SHAKSPEARE AT STRATFORD-ON-AVON. — The annual series of Shaksperian Memorial Performances at Stratford-on-Avon have again this year, for the fifth time, been undertaken by Mr. F. R. Benson, and will consist of eight representations of Shaksperian plays, including a most interesting revival of "Timon of Athens," a tragedy that has not been seen on the boards since Phelps produced it at Sadler's Wells about twenty-five years ago. The performances commence on Monday, April 18, and will be as follows:—Monday, 18th, and Tuesday, 19th, "A Midsummer Night's Dream;" Wednesday, 20th, "Julius Cæsar;" Thursday, 21st, "Twelfth Night;" Friday, 22nd, and Saturday, 23rd (Shakspeare's birthday), "Timon of Athens." There will be also two matinées, one of "A Midsummer Night's Dream" on Monday, 18th, and one of "Timon of Athens" on Saturday, 23rd. Special trains will be run from London on Friday, the 15th, and Friday, the 22nd. There will also be special trains from Northampton, Birmingham, Wolverhampton, Leamington, and surrounding districts.

# Illustrations.

## MURAL PAINTING IN THE CHAPEL, MAYNOOTH COLLEGE.

OUR illustration represents the first of a series of fourteen "stations," which go round the choir of the chapel of Maynooth College. Each station, with its accessory ornament, occupies a space of 15 ft. by 8 ft.

The subject of the first station is taken from St. John, xviii., v. 28, &c. Our Lord is before Pilate; in the background are the Jews who will not enter the hall; Pilate, therefore, comes to the atrium to meet them, and there listens to their accusations, &c.

The other thirteen subjects are those now commonly used to complete the pilgrimage of the "Via Crucis." Seven of these are completed.

In the adjoining bay, next to the first station, are the four Major Prophets, with their prophecies of our Lord's sufferings and passion.

Besides these paintings in the lower part of the choir, Mr. Westlake has designed the roof decoration; and the figures (life-sized), ninety-two in number, are from his *atelier*. It is one of the largest painted roofs now existing in a Gothic church, and may be classed with those at Ely and St. Albans, in England; and St. Michael's, at Hildesheim, in Germany. The figures in the sanctuary roof, twenty in number, represent Apostles, Evangelists, and Prophets. Those in the nave comprise Our Lady with the Divine Infant, SS. Michael, John the Baptist, Joseph, Celestine, Patrick, Bridget, and Laurence. Following these are a series of angels with instruments of the passion, &c., whilst the western end contains the principal national saints. Around each saint or angel there is a versicle. The whole of the three hymns, the "Te Deum," "Quam Dilecta," and "Benedictus," are thus given.

Around the scroll and versicle are ornamental foliated borders, in gold and low-toned colour.

The whole of the work is done under the care of Mr. Hague, the architect, of Dawson-street, Dublin, whose designs won the competition which was called some three years ago for the completion of the decoration of the chapel, which has been pushed on with untiring energy by the present President, the Very Rev. Canon Browne, D.D.

N. H. J. W.

## DESIGN FOR A CHAPTER HOUSE.

THIS design, by Mr. John Begg, was one of those submitted to the Council of the Institute of Architects in competition for the Soane Medallion, and obtained for its author a "medal of merit" as the second best design sent in.* The material was intended to be brick with stone dressings for the exterior, with a lead-covered roof. For the interior work stone and red brick, the latter being proposed for the filling in of the groining. The stalls would be of oak, and the floor of dark grey or black and white marble.

We give the exterior perspective, a reduced copy of the plan, and the section. The treatment of the buttresses, carried right up to the plane of the mullions, with the arch mouldings butting against them, has a very bold effect, and the whole design is very creditable to its author.

## DESIGN FOR A STONE RAILWAY-BRIDGE.

THIS is the design for which the Grissell Gold Medal, for constructive work, has been awarded by the Council of the Institute to its author, Mr. Harold Harlock. As the author has sent us no description of his design, we must leave the drawings to speak for themseves. The Grissell medal being given for constructive design, the work is to be judged, we presume, purely from an engineering point of view; though we may suggest that architects, in competing for such a medal, might very well endeavour to improve a little upon the engineering type of design, and see if construction could not be combined with a little more of architectural effect and expression than we usually find in works of this class.

* The design, by Mr. Heber Rimmer, which gained the Soane Medallion, we shall illustrate later on; it is unavoidably postponed for the present.

## *COMPETITIONS.*

TECHNICAL SCHOOL, HEYWOOD, LANCASHIRE.—On the 8th inst., at a meeting of the Technical Instruction Committee held in the Council-chamber, Heywood, the assessor's award was opened and the result made known of the competition amongst architects for plans for the proposed Technical School, Heywood. Mr. Tuke (of Messrs. Maxwell & Tuke), Manchester, was the assessor, and in his award he stated that he had no hesitation in awarding the first premium in the competition to the plans marked No. 2A and No. 2B, alternative plans, sent in by the same author. He experienced some difficulty in deciding upon the respective merits of the plans for the second and third premiums, but he suggested that the premiums should be divided equally between the plans marked No. 3 and No. 10. The Committee resolved, after deliberation, to adopt this suggestion, and the premiums are, therefore, awarded as under:—First, Messrs. Woodhouse & Willoughby, Manchester and Stockport; second and third, Messrs. Butterworth & Duncan, Rochdale, and Mr. F. Brockbank, Liverpool.

FARNWORTH PUBLIC BATHS.—In the limited competition for this work an amount was stipulated for the cost which was not to be exceeded. This condition not being fulfilled by the design at first selected, tenders were obtained for the execution of the buildings according to the design which was placed second in the competition, and as submitted by Messrs. Bradshaw & Gass, of Bolton. These tenders being satisfactory, the work has been put in hand according to their designs.

ROSSIVILLE ASYLUM, N.S.W.—In the competition for Rossiville Asylum (New South Wales), the judges, after no less than twenty sittings, have placed the competitors in the following order of merit:—

1st, Messrs. Sulman & Power,
2nd, Mr. Jno. Kirkpatrick,
3rd, Mr. C. D. Payne,
} Sydney.
4th, Mr. — Clarke, Brisbane.
5th, Messrs. McKinnon & Weitzel, Sydney.

The name of Mr. Sulman, whose design in conjunction with Mr. Power is placed first, will be well remembered among our London readers.

BUILDING INDUSTRY, MEXICO.—According to a recent report of the British Consul at Mexico, there were in that city, at the end of 1890, houses worth 19,853,152*l.*, an increase of 2,447,866*l.* or 14·3 per cent., since 1888. The increase in value of the same class of property in the small suburban towns of the Federal district during the same period was 126,342*l.*, or 20·35 per cent. This development of the building industry is due not so much to any great increase of the population as to the general increase of wealth and a consequent demand for more commodious houses. It has a direct interest to British trade, in having opened a market for foreign building material, which, a very few years ago, did not exist.

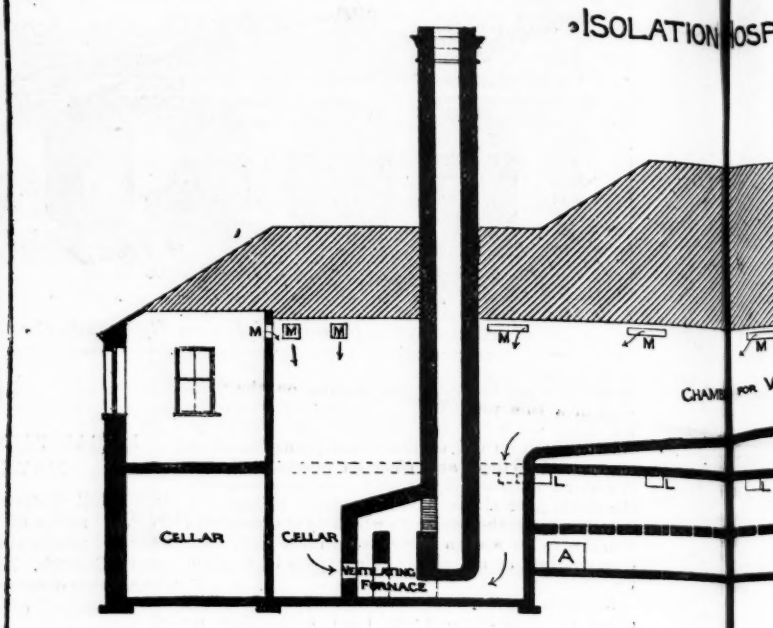
LONDON PROPERTIES FOR SALE.—At the Mart, on the 28th instant, the second portion of the City-road Estate, Islington, comprising twenty-four houses, situated in the City-road (western end), Duncan-terrace, Sidney-street, and Goswell-road, being freehold, and yielding a rental amounting, in the aggregate, to about 1,394*l.* per annum. Also, consequent upon the death of Mr. J. J. Keily, twenty-four freehold houses in the same quarter,—including Nos. 1-5, Colebrooke-row,—producing an aggregate rental of 1,545*l.* a year; and Blackhorse-yard, with other building sites, tenements, &c., covering a total area of 2½ acres, near to the "Angel" tavern, and lying north and south of the City-road. Many of the houses have large front or back gardens; some of them, being Nos. 2—15, Duncan-terrace, and 391-403 (odd), City-road, are scheduled in the Bill for an extension of the City and South London Electric Railway.

## BRADFORD SMALL-POX HOSPITAL.

WE give the plans and section of the new isolation wards of this hospital, of which Messrs. Morley and Woodhouse are the architects. The hospital is arranged with two wards, each 72 ft. by 15 ft., which are placed back to back, having a space of 3 ft. between them. Bath-rooms, w.c.'s, slop sinks, and linen shoots are arranged at the end of each ward, and nurses' rooms adjoin the wards at the entrance ends, with supervision windows to each ward. A private ward is also provided. A special feature of the arrangements is an undressing-room for convalescents, where they leave behind hospital clothing, and then pass into a bath-room, and thence into a dressing-room, where their own clothes are put on, and from this room they pass direct into the outer air, thus doing away with all risk of carrying infection away with them. The drainage is divided into two separate and distinct systems; the one for roof and surface-water goes direct into the mains, but all the foul drains empty into disinfecting tanks, which are duplicated, so that whilst one tank is being emptied after disinfection, the other is receiving the drainage, and going through the process of disinfection by an admixture of chemicals.

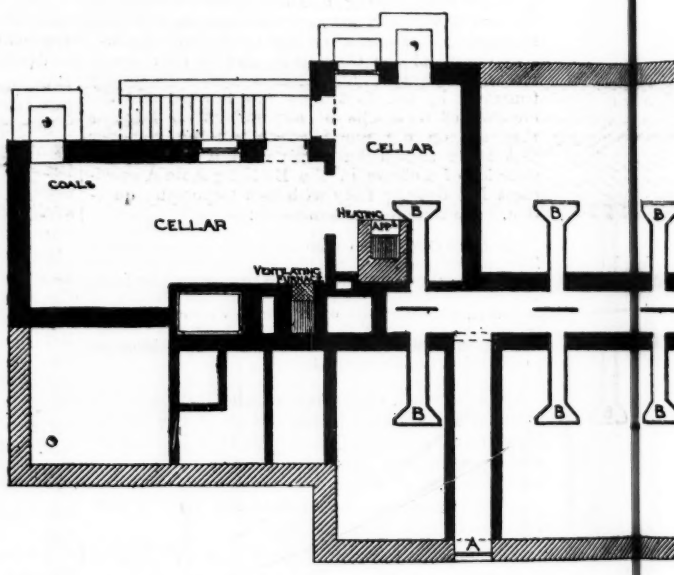
Special arrangements are made for the destruction of the germs of disease. All the windows are made tight, and the fresh air is let in by three shafts from the outside, carried under floors and into the lowest compartment of the 3-ft. space between the two wards. Above this compartment, and divided from it by flags with open joints, in another compartment are placed the heating pipes, which are very powerful, and from this compartment flues are carried into the wards which conduct the fresh air (warmed in cold weather by contact with the heating pipes last named) into the same through gratings in the floors, one being placed at the foot of each bed. Above the compartment last named is an extracting flue made perfectly air-tight, and into this flue openings are made at the ceiling level of the wards over each bed. A powerful furnace, with honeycomb fire-brick divisions, is placed in the cellar at the end of this flue, and this furnace draws the foul air out of the wards, and it passes through the furnace and out into the open air by a large chimney. Thus all vitiated air from both wards, w.c.'s, bath-rooms, &c. (which are all connected with the flue), passes through a furnace which is heated up to at least 800 deg., and therefore is more than sufficient to destroy all obnoxious germs. The working of the scheme has been properly tested by the anemometer, and it has been found that at least 10,000 cubic feet per hour per patient can be passed through the wards and out through the furnace, and that at the same time in cold weather a temperature of at least 60 deg. can still be maintained in the building.

The contractors for the building were:—Mr. Farnish, mason; Messrs. Wilkinson & Dawson, joiners; Mr. J. Wood, plumber; Messrs. Cordingley & Sons, plasterers; Messrs. Hill & Nelson, slaters; and Mr. J. Arundel, painter. Mr. Bancroft acted as clerk of works.

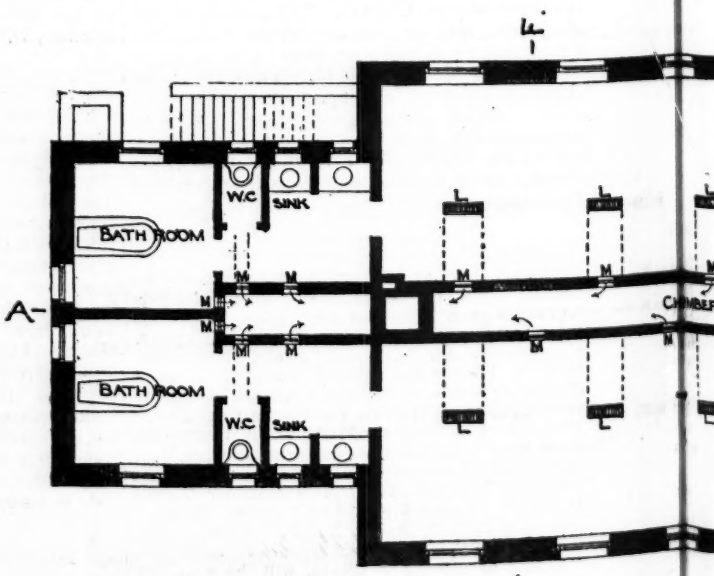



M. GRATINGS AT CEILING LEVEL FOR EXTRACT OF VITIATED AIR.
A. COLD AIR INLETS.
L. FRESH AIR TO WARDS.

SECTION




A. COLD AIR INLETS.
B. FRESH AIR FLUES THRO' FLOOR INTO WARDS.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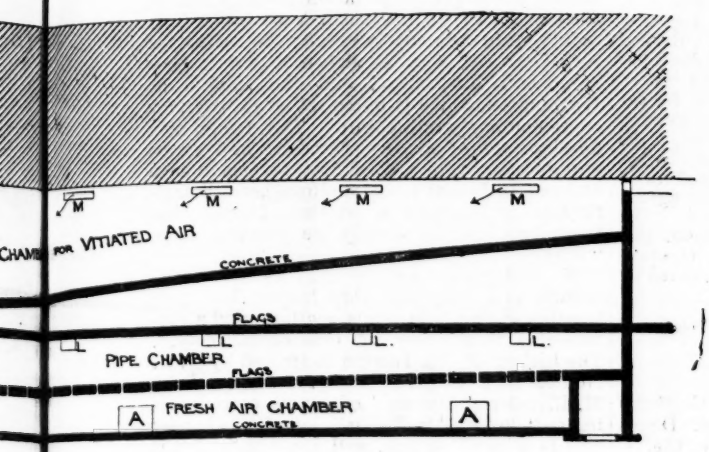
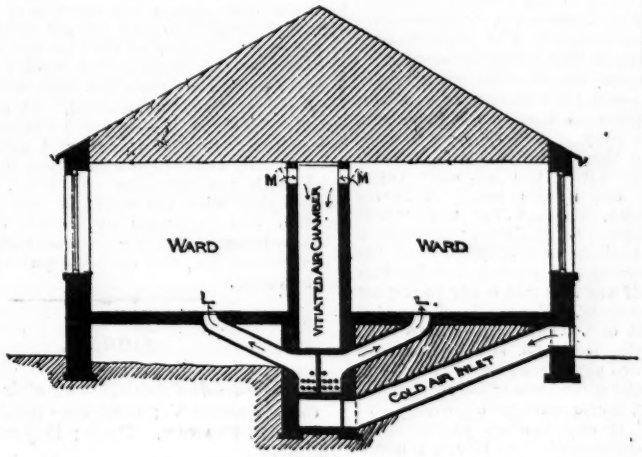
# TION HOSPITAL FOR SMALL POX - BRADFORD CORPORATION.




SECTION ON LINE A.B.

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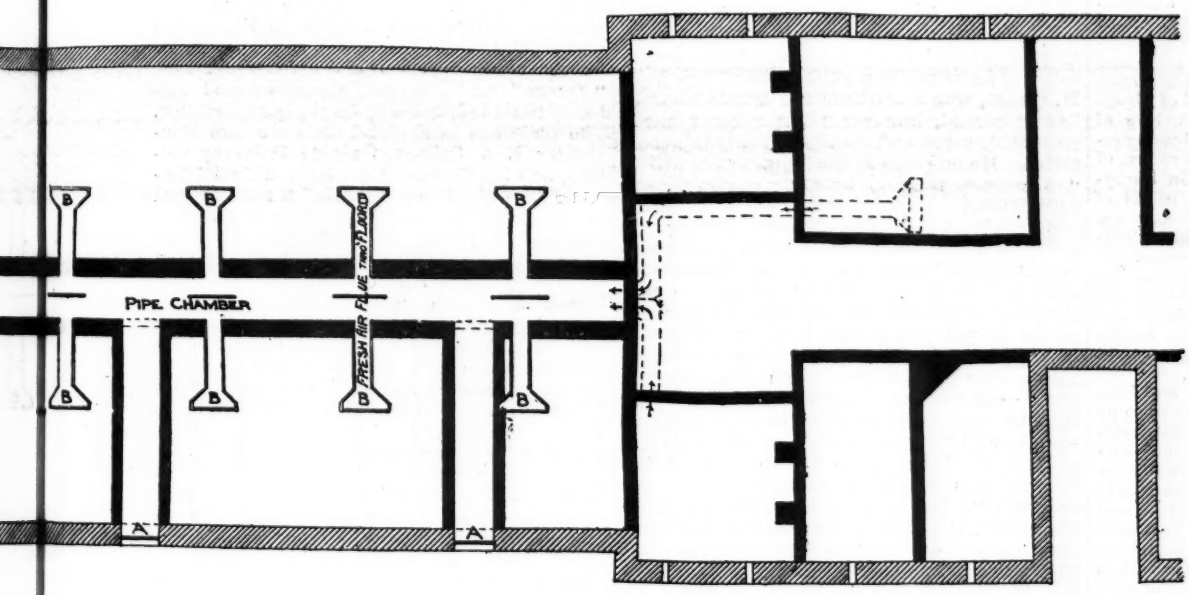
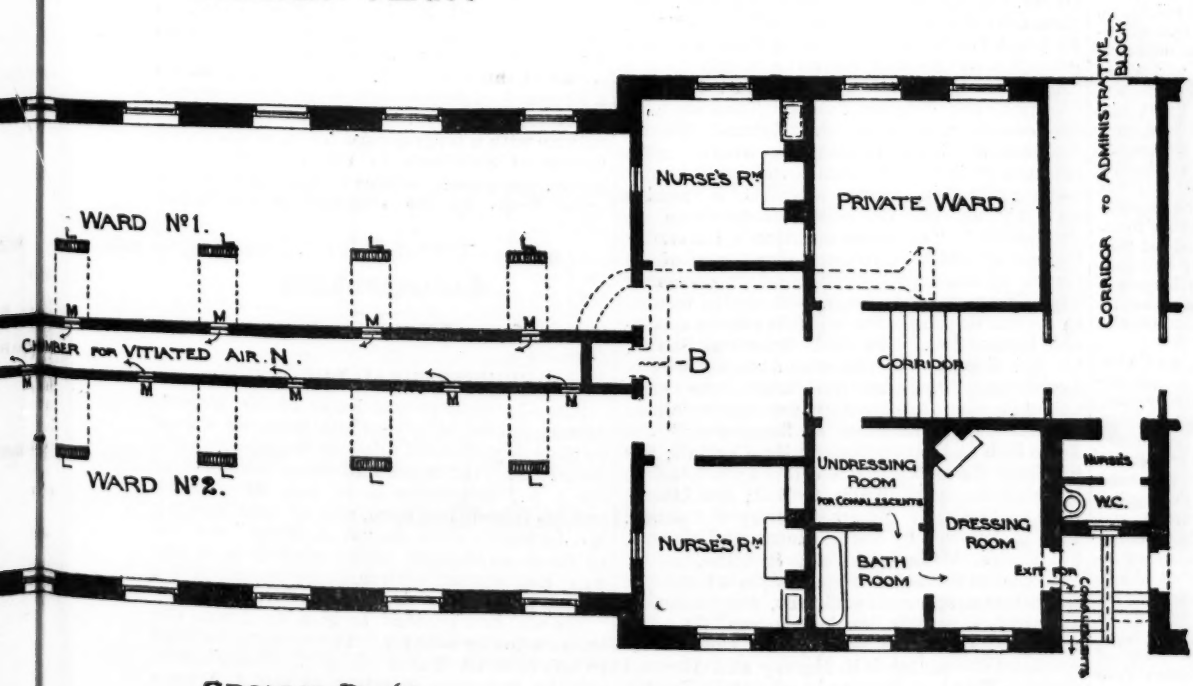



BASEMENT PLAN.




GROUND PLAN.

SCALE OF FEET. 0 10 20 30 40 50.

W. J. MORLEY ARCHT.

TELLIGRAPH Nº 2

## THE SANITARY INSPECTORS' ASSOCIATION.

AN earnest and interesting address was delivered on the 2nd inst. before the members of this Association at Carpenters' Hall, by Mr. J. Davenport, C.E. (Nantwich Union), one of the founders of the North-Western Sanitary Association, Mr. H. Alexander, the Chairman of the Council, presiding. The title chosen for the lecture was "The Sanitary Inspector—His High Calling." The paper claimed not only the sanction of the noblest of sciences,—that of saving human life, for the work of the Sanitary Inspector,—but the sanction of a Divine prescription as express as that which those who seek to save souls obey. A very close parallel was drawn between the canons of sanitary law as developed by science during the last sixty years, and the canons of the Mosaic law. A Divine origin was, in short, claimed for the "laws of health." Isolation of patients, destruction of sources of contagion, and cleansing of the most thorough character, were enjoined by this law, and God himself was declared ready to inspect the results, in the passage, "For the Lord thy God walketh in the midst of thy camp; therefore shall thy camp be whole, that he see no unclean thing in thee and turn away from thee." The leper and every one that was defiled was made responsible for his own isolation, for he must call out with a loud voice, "Unclean!" if any healthy person came near his place of banishment. An infected house must be scraped, and the dust be removed to a special place outside the city; and, if that were not effectual, the house must "be broken down, and the stones, timber, and mortar carried out of the city." Infected garments of woollen or linen, warp or woof, or skin must be burnt with fire. The reward of obedience was immunity from epidemics, the penalty of disobedience, annihilation by them. The penalty was illustrated by reference to plague years in England in the seventeenth century, when 310 per 1,000 (in 1625) and 430 per 1,000 (in 1665), were the horrible death rates of the years of the plague. The reward of obedience was also illustrated. The Great Fire of London so effectually carried out the Mosaic precept, that London has never since had a return of the scourge. At the village of Eyam, in Derbyshire, where a tailor had received a parcel of woollen clothes, the death rate reached its maximum, the tailor and five out of every six of his fellow-villagers dying of the plague in a few months. It was only after the survivors had been induced by two heroic parsons to isolate their village from the rest of the world and to burn every stitch and stick, that the plague was stamped out. In the present century, the visit of the Asiatic cholera in 1831 had been a blessing in disguise, for that epidemic had originated sanitary reform, and thus been the main cause of the advances made since by sanitary science. It had been shown that the death-rate from certain of these diseases was only one-hundredth of the rate of sixty years ago, and in the typhoid classes the mortality had fallen from 1·23 to 0·18, or down to one-seventh. A report of the Local Government Board showed that 250,000 lives were saved in the decade 1871-80, which would have been lost had the death-rate of the previous thirty years been maintained, and counting twelve cases of sickness for one death, three millions of people, or one-ninth of the population, had been saved from sickness, by causes not previously in operation. Their late president, Sir Edwin Chadwick, than whose, no name stood higher in sanitary circles, had calculated the money saving by the improved state of the British Army at 344,000*l.* a year, and a life saving of 40,000 men in ten years. But from him we also knew that there still remained a great deal to do, for even with our reduced death-rate, preventible disease was slaying over 100,000 lives every year, that might be saved with improved sanitation. The sanitary inspector represented to a great extent for the people of his district the present state of hygienic knowledge and to the other functions of his "high calling" he therefore added that of educator. It was in the spirit of study and contemplation that the duties of the sanitary inspector should be undertaken, and if so undertaken he must become a power in the regeneration of the world.

The Chairman, in inviting discussion, said that when they found they could not hope to get Sir Robert Rawlinson to give them an address by reason of his great age and feeble health, he had selected the next best man, well knowing that Mr. Davenport would talk of something better than D-traps and drain-pipes. A vote of thanks was proposed by Mr. West (Walthamstow), who warmly eulogised the paper. Mr. Poulson (Chelsea) seconded the motion, and continued the discussion. He objected to the idea of a Divine origin being ascribed to sanitary laws on account of anything that Moses might have said or done. Moses had learned all he knew from the Egyptians. If they had seen, as he had, at the Natural History Museum, "The Book of Death," they would find out that the ideas of the Egyptians on public purity and sanitation were simply splendid. They had their sanitary inspectors, their sanitary regulations, aye, and their sanitary engineers, whose works spoke of their almost superhuman talent in the remains of the great city of Memphis. The Egyptians were the very antithesis of another ancient people, the Chinese, whose sanitary ideas were beneath contempt. Mr. Thomas (Bermondsey) said he felt as deeply impressed with the importance of his work as any minister of the Gospel did of his ministry, but nothing was to be gained by confusing the calling of the one with that of the other. He had the co-operation of his clergy, and very glad he was of it, because they always left the care of the bodies of the parishioners to the proper officers. He had been so well supported that he had cast down 300 houses to the ground, and twelve more rotten houses would have gone the same way but for the opposition of certain interests. At every meeting of his Board he had repeated the same cry, "the disgraceful state of things still exists in Crosby-row" until, weary of the iteration, they had armed him with the authority asked for. He agreed thoroughly with the spirit of the paper. The motion was supported by Messrs. Edwards, Dee (Westminster), Turner (Greenwich), Goodwin (Richmond), &c., and on being put was carried by acclamation.

## Books.

*Encyclopédie de l'Architecture et de la Construction.* Volume V.; deuxième fascicule. Directeur, P. PLANAT. Paris; Dujardin et Cie.

THE fifth volume of M. Planat's encyclopædia takes us nearly to the close of the letter M, and contains several important articles: "Lombarde," "Louvre" "Lycée," "Mairie," "Maison," and "Moderne (architecture)" among them. It may be questioned whether such a heading as "Modern Architecture," which is so large and extended a subject that it would require a treatise to itself, fairly comes within the proper scope of an article in a publication of this kind. M. Planat, who contributes the article himself, has succeeded, however, in bringing it within reasonable scope and making it fairly representative. He proposes as the object of the article "to indicate rapidly, by some examples, the actual tendencies of architecture in different countries" at the present day. Taking the principal countries alphabetically, "Architecture Anglaise" takes the lead, is treated with more knowledge and sympathy than we find accorded to this country in some other portions of the encyclopædia, and is fairly illustrated. It may be interesting to the reader to notice the buildings which the French critic selects for illustration. Remarking that the variety of religious sects in England leads to an interesting variety in their religious edifices, M. Planat gives first a view of Mr. Waterhouse's chapel in Mayfair, in which the architect "à fait la marque caractéristique de son talent, et qui permettre de reconnaître sa main comme on discerne celle d'un peintre." Next comes "L'Église St. Pierre" at Ruddington by Messrs. Bell & Roper, followed by "L'Église St. Jean Baptiste" at Brighton, by Mr. S. J. Nicholl. But that ends the churches! Of Mr. Pearson the editor seems ignorant. We have next the Art Gallery at Sheffield by "MM. Floken & Gibbs" (how is it that French writers *cannot* copy English names correctly?), and following that the interior of Mr. Robson's library at the People's Palace. Then we have the central portion of the Natural History Museum at South Kensington, where "nous retrouvous également l'emploi de ces hautes tours multipliées, sans lequelles il semble qu'il n'y ait pas d'architecture moderne en Angleterre." The same architect's University College at Liverpool follows; then a part of the centre of the Law Courts' façade, apparently copied from a photograph, without the trouble to correct its distortion of lines; not a creditable illustration. The Girls' School at Bristol, by Mr. Gough, "se rattache à ce style de la Renaissance anglaise qui n'est pas sans analogie avec le caractère des constructions allemandes, hollandaises et flamandes;" the Town Hall at Leamington, by Mr. Cundall; the buildings for an insurance company in London, by Messrs. Aston Webb & Bell; the Liberal Club at Leeds, by Messrs. Chorley & Cannon. This is followed by Ascott House, at Leighton, by Messrs. Williams, West, & Slade, as an example of the picturesque style of modern English house; one is sufficient, for "qui a vu un cottage anglais les a tous vus" (!). An entrance-hall interior from Palace Court, Kensington follows, by MM. Harvey and Bernard Smith. That is the end of the English examples. Can it be believed that the name of Mr. Norman Shaw is not even mentioned, nor one of his works illustrated! Mr. Planat has something more to learn about contemporary English architecture. The illustrations, though necessarily on a rather small scale, are mostly very well executed.

Modern German architecture is fairly illustrated; the subject is of course much larger, as it covers far more ground. Of Italian architecture the largest illustration given is that of the new Palais de Justice at Rome. American architecture does not fare well; the design for New York cathedral is shown in a very poor and small illustration, and the Capitol at Washington, which is going rather far back for contemporary architecture. The remarkable development of modern domestic and street architecture in the United States seems to have escaped M. Planat's notice altogether. French modern architecture is omitted, having been treated sufficiently already, we presume, under "France."

M. Dedartein's article on Lombard architecture is a long and very largely illustrated treatise, giving both plans, sections, and a considerable illustration of ornamental details. The history of the Louvre is treated by M. H. Nodet, and the subject of "Lucarne" by M. Rivoalen, "lucarne" of course corresponding to "dormer" in English. As far as it goes this is a good article, well illustrated; but it has the defect that we have noticed in many others of the smaller articles in the Encyclopædia, that it is entirely confined to French examples, without the slightest hint of any others, and is an essay which could only find its proper place in an "Encyclopædia of French architecture," not in an "Encyclopædia of Architecture." In the article on "Lycée," which is really a term peculiar to France, the author, M. Charles Lucas, is more broad in his views, and divides his article into two sections, "France" and "Étranger," though we are bound to say that the latter is by far the smaller section. The buildings in England illustrated are Manchester New College, Oxford; Holloway College, and the Technical Institute in Exhibition-road. The article on "Mairie" is more general in character and in the selection of its illustrations. "Maison," by M. Rivoalen, is a rather shorter article than we should have expected for such a large subject, compared with the length at which less comprehensive subjects have been treated. The illustrations are very inadequate, and are nearly all French; there is a curious travesty of the "Cottage Ouvrier Anglais," professing to be taken from a model in the Exhibition of 1878. Among the practical articles, "Matériel de Chantier" is treated at some length by M. C. Bazin, and "Menuiserie" rather inadequately by "E. R." M. Rivoalen treats of "Metope," which (we need hardly say) he regards as essentially *remplissage*; he omits to give the Greek form and derivation of the word. "Musée" and "Museum" are treated as separate subjects, the former being referred to museums of art, the latter to natural history museums. The most pleasing building under the heading of Musée is that at Laval, an excellent example of the graceful semi-Classic architecture often employed by the French on works of this class. M. H. Saladin contributes a long and elaborate article on Mahommedan architecture, and M. Charles Lucas finishes the volume with a biographical notice of the Mylne family of architects in this country. As a whole, the present volume of the Encyclopædia quite keeps up the standard of the former volumes.

## Correspondence.

*To the Editor of* THE BUILDER.

### ARCHITECTURAL EDUCATION.

SIR,—In reply to the letter of Mr. Cole A. Adams, published in your last issue, we should be glad if you would allow us to make it quite clear that "the some half-dozen members of the A. A.," referred to in it, met Mr. Jackson and his friends but once, and at that meeting Mr. Jackson's letter to "A. A. Notes" was not so much as thought of or referred to in any way, and was not written at the request of the "some half dozen," as stated by Mr. Adams.

We will now proceed to give Mr. Adams the information he asks for. The meeting referred to was held on March 15, at 7, Storey's-gate, and the following members of the A. A. were present:—Messrs. C. H. Brodie, H. O. Cresswell, O. Fleming, E. S. Gale, W. Millard, T. E. Pryce, F. M. Simpson, and L. Stokes. The following

non-members of the A. A. were also present:—Messrs. R. T. Blomfield, T. G. Jackson, A.R.A., Mr. Macarthey, E. S. Prior, and E. P. Warren; We met with the object of ascertaining whether or not Mr. Jackson and his friends would help actively the work of the A. A. Now, it was most clearly stated and understood that the members present simply attended in their private capacity, and did not represent any one or any one's views but their own. Mr. Jackson, therefore, was not "led to suppose that they"—the some half dozen—"expressed the voice of the A. A.," as Mr. Adams assumes.

Mr. Jackson and his friends stated their willingness to help, but stipulated for the absolute independence of the A. A. and its scheme, and pointed out that this was endangered by the frequent reference to the Institute examinations made in our Brown book and Curriculum. Other points were discussed, but the independence of the A. A.,—strangely the very cry that Mr. Adams has now so curiously set up,—was the only one that was insisted upon.

The result of this meeting has since been formally laid before the A. A. Committee. Perhaps if Mr. Adams had known this he would not have troubled you with his letter. We, however, are glad that he did so, as we now have it clearly recorded that Mr. Adams intends to fight for the good "old traditions" and "sturdy independence" of the A. A., which is just what most of us desire.

Mr. Adams reminds us,—quite unnecessarily,—that the Institute has made a generous grant to the funds of the A. A. We also are aware that several prominent members of the Institute have likewise helped us generously; but Mr. Adams appears to forget that on our subscription list there are also such names as Sir F. Leighton, P.R.A., R. Norman Shaw, R.A., Professor Herkomer, R.A., Sir A. Blomfield, A.R.A., Professor Aitchison, T. G. Jackson, A.R.A., Somers Clarke, B. Champneys, C. H. Mileham, and others.

Mr. Adams misrepresents Mr. Jackson—no doubt, unintentionally—when he states that Mr. Jackson wants us to "give up our present scheme of studies." This is not the case, as with the exception of a few details, he and his friends generally approved the scheme.

It would be difficult, we imagine, to adopt a more "independent course" or one more calculated to serve the best interests of the Architectural Association, than to seek advice from all capable men, without stopping to inquire to what body they may happen to belong.—We are, sir, &c.,

C. H. Brodie. Walter Millard.
H. O. Cresswell. Thos. Edward Pryce.
Owen Fleming. Fred. M. Simpson.
Ernest S. Gale. Leonard Stokes.

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## "STEAM ROAD-ROLLING."

Sir,—Will you kindly allow me space for a few remarks on the letter from Mr. Robert Phillips, the County Surveyor for Gloucestershire, published in your issue of March 26 last?

Mr. Phillips makes a broad statement that "steam-rolling cannot be defended on economy of cost," and afterwards adds "it saves by consolidation without abrasion or trituration one-eighth of the metal."

It must, therefore, be apparent that if the cost of rolling in a cubic yard of material, less the cost of after-raking is less than one-eighth of the cost of the material when spread on the road, economy is the result.

In illustration I here give actual figures from my own district:—

| Average cost per cubic yard of materials used on main roads. | £. | s. | d. | Average cost of rolling in one cubic yard of material. | £. | s. | d. |
|---|---|---|---|---|---|---|---|
| Quarrying, Royalty, Hauling, Yarding, Breaking | 0 | 4 | 3 | Wages of driver, do. 2 sweepers, Water hauling, Coal, Stores | 0 | 0 | 9 |
| Spreading (including hauling from depots) | 0 | 1 | 0 | Depreciation of steam roller and water-carts | 0 | 0 | 9 |
| | £0 | 5 | 3 | Less cost of after-raking.. | 0 | 0 | 2 |
| One eighth = | 0 | 0 | 7⅞ | | £0 | 0 | 7 |

A saving of ⅞ of a penny is therefore made on every cubic yard of stone rolled in by the steam roller.

This is taking Mr. Phillip's view, viz., that the saving in materials is one-eighth. My own experience, however, is that the saving is very much greater, and that one-quarter would be much nearer the mark. Taking this standard the above calculation would show a saving of nearly 9d. a cubic yard. Allan Greenwell, A.M.I.C.E.

Surveyor to the Frome Highway Authority.

*Frome, Somerset*, April 8, 1892.

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## REMOVING OLD PAINT.

Sir,—Referring to Mr. H. F. White's letter in your issue of Saturday, permit me to state that I have found the following a very successful method of removing old paint from stonework. Take a fresh lime shell and strong black soap, mix together into a lather and lay on the paint. The mixture cannot be too strong for this purpose. Allow it to lie for two hours, and if at the end of that time the paint does not come clean away it can lie longer. A brush may be used gently. I hope this may serve Mr. White's purpose.—Yours, &c.,

D. McArthy.

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Sir,—I beg to recommend the following as a sure remedy:—Three pounds of common washing soda, 4 lbs. of unslacked chalk of grey stone lime dissolved in boiling-water, and made about the thickness of cream, and applied hot with fibre brush and washed off with clean cold water with a fibre scrubbing brush. This applied two or three times will remove the paint and leave the stonework perfectly clean. The materials are cheap, and can be easily mixed in any quantity at the same rate.

Geo. Godbolt.

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# The Student's Column.

## WARMING BUILDINGS BY HOT WATER.

### XVI.

### BOILERS: INDEPENDENT.

INDEPENDENT boilers, as the term signifies, are those that need no brickwork in their setting (assuming that the floor upon which they stand is not inflammable), and all that is usually necessary is to place them in position, and connect with the nearest chimney by a pipe. If no brick chimney exists, then the flue pipe is carried up to a sufficient height to form a chimney in itself. The fire-box is situated below the boiler, within an iron casing, in fact, forms a base upon which the boiler rests.

As a rule, these boilers are not used in large undertakings, although there is no reason why they should not be. The boiler, however, in large horticultural works is placed in a pit, and in building works is similarly situated or given a little house or room to itself. In both these cases the brickwork is not objectionable, and it is understood that brick-set boilers are cheaper than the independent kind. In many forms of boilers brick-setting is really necessary to benefit by the flues that can be conducted around their outer surfaces. This cannot be done with independent boilers, and the other surface or shell cannot be made use of. This is the drawback to boilers of this kind, for we are not only unable to conduct the flames or hot gases around to the outer surface as they leave the fire, but this outer surface goes to waste a considerable amount of heat by radiation, if it is not covered with some poor heat-conducting compound.

Reference must again be made to Keith's boilers, as these, in this respect, differ from the ordinary independent patterns. The chief peculiarity in these boilers is that, being made of cast-iron, and in sections, the inner direct heating surfaces can be made of any design to best benefit by the heat; designs such as cannot be made with wrought plates. For instance, the sections of the Challenge boiler are chiefly made much resembling large gratings, the bars of which have a waterway through them from side to side of the jacket. By an arrangement of this kind we get such a great direct heating surface, within a small compass, that it is doubtful if the heated products would be of much value when they eventually escaped. By making such a number of surfaces, all obstructing the free passage of the heat, we can rob the air and gases, and make them of quite a low temperature at the outlet.

Every kind of independent boiler should, if economical results are aimed at, be covered with some bad heat-conducting material. The loss of heat from the outer surface of a boiler, when exposed, is really considerable. Brickwork would effectually prevent this, but independent boilers are intended to dispense with this. Silicate cotton would answer excellently, but it is somewhat difficult of application, upon upright boilers in particular. The material used by the writer is Leroy's composition, which, when once become accustomed to, is easy of application, and decidedly efficacious. We shall have to refer to the subject when speaking of main pipes when they are not used for radiating purposes, but merely to convey hot water to the branches.

There is a little care needed in fixing independent boilers. It is possible to fix a boiler so that the fuel will not burn properly, that is to say, the fire will not "draw"; and, doubtless, most of our readers know that it is quite possible to fix a boiler and its flue pipe, so that it suffers with a down draft.

It takes but little draft to work an independent boiler of any kind, as, supposing it is one having flues within it, these all ascend or incline towards the chimney, very different to fixing an independent or portable cooking range, having flues for the flame to be carried *down* beneath the oven, boiler, &c. If a brick chimney exists, a pipe is carried from the boiler into this chimney, either up through the mouth or bottom aperture, or through the brickwork of the breast. The flue pipe can be carried horizontally or ascending, but, without a skilled opinion, it is not desirable to make the pipe descend anywhere. If the pipe is carried up into the mouth of the chimney the opening must be closed up tightly around the pipe with sheet-iron. If the pipe is carried through the breast, the brickwork is made good around it and the lower opening quite closed up. The rule that has to be followed in fixing close fire-stoves, ranges, and boilers is to complete the work so that all the air passing into the chimney first passes through the fire. There should not be any means whatever for air to pass into the chimney without first passing through the burning fuel. This rule will bear relaxing a little, if necessary, with stoves and boilers which have no descending flues within them, but if it is convenient to strictly adhere to the rule it is better, and the work will then bear criticism.

Every independent boiler is provided with a ventilator arrangement in the ashpit door, which acts as a damper, by regulating the passage of air as the openings are opened or closed. This is correct in principle, but they are often badly fitted and not liked by the average attendant. It is much better to put a proper damper in the flue-pipe, near the boiler, and convenient for use. A throttle-damper (like a throttle-valve), a disc of metal in the pipe operated by a handle outside, is commonly used, but these are not very reliable. A sliding damper, which works in a little square casting, is better. They are cheap and easily obtained.

Independent boilers are more generally used in building works, which accounts for our explaining how they can be connected with existing brick flues, but if no brick chimney can be pressed into service, it becomes necessary to carry the pipe through an outer wall, and up outside to the top of the building. If a glass house, then the pipe need not be carried far; but if a residence or warehouse, the pipe may have to go a great height, and on this account every effort is made to utilise one of the chimneys of the building. In any case, we cannot hope to be free from down draught unless the chimney terminates above the building, and well above its highest part. It is impossible to even briefly treat the subject of down draughts here on account of the many points it involves, but it must be understood that unless a chimney terminates as high as stated, trouble will ensue. If some form of cap or wind-guard can be used and permit of the pipe terminating at some point below this, then it should be considered a fortunate circumstance due to some favourable condition, such as could not be expected to happen every time by any means. If the boiler is situated in a boiler-pit outside a glass-house, the question of down-draught is not considered so much, for, supposing down-draught does occur, it does no harm, and the gusts only last for a moment or two at a time in certain weathers. If, however, the boiler is in a residence, or building of almost any kind, the outbursts of smoke, &c., from the furnace would be intolerable, and would have to be prevented by some means. When using pipe-flues, it is very necessary that the joints be made air-tight. Common putty is best for this, it hardens with heat.

The smallest independent boilers we have are those heated by a gas-burner or lamp-flame, and which have the pipes, &c., complete as

fig. 59. These are very useful appliances for the little greenhouses that are attached to small residences. They merely require the gas to be connected, and are then ready for use and act very effectively. If oil is used, no connexion whatever is necessary, but there is a general

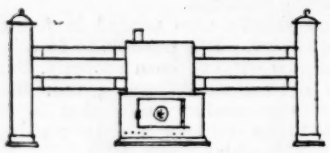


FIG 59

aversion to oil for heating purposes, as a disagreeable odour is easily obtained. If the stove is of any but very small size, and is heated by gas, it is necessary to have a flue to it to convey away the products of combustion. This flue only requires to be of small size, but if it is to be effective it must be carried in the same manner as a smoke-flue; it is important to note this.

The products of combustion from a gas-burner are water and carbonic acid. Heat is also evolved, but this is more an effect of combustion than a product. In addition to the products named, there are certain gases which are the result of impurities or foreign substances in the gas. The particularly objectionable one of these is sulphurous acid, which comes from the small percentage of sulphur which the gasworks cannot wholly eliminate. This product is very hurtful indeed to plant life, and were it not for this the other and proper products could be borne to a considerable extent. One maker of these little appliances fits them with a purifier (as he terms it) which is intended to intercept and absorb this particular ill product.

There are several gas boilers made that are intended for larger and more practical purposes

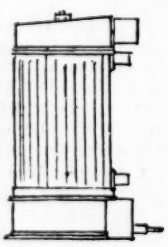


FIG.60

than that just referred to, one, as fig. 60, made by Fletcher & Co., being a good example. Keith also makes a good gas boiler, as fig. 61. Gas boilers are never made very large; it is considered to be more economical to use two or more of them,—a battery, so to speak, if there

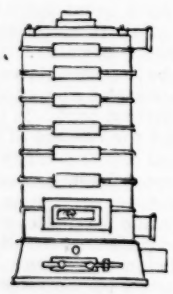


FIG. 61

is much pipe to be heated. Effective flues have to be provided with these larger sizes, and, as a rule, it is considered best if they can be fixed in a little outhouse of some kind, so that any escape of gas may prove harmless. The flue should also be outside the building for the same reason. If the flue exhibits a down-draught, a great deal of trouble will be occasioned by its extinguishing the gas-flame, or causing it to light back in the air chamber, if it be an atmospheric burner. It must not be forgotten that the water product will probably be condensed in the iron pipe, and a tiny stream will be constantly trickling down it. This can be easily disposed of.

These blocks were inadvertently omitted in the last chapter of "Student's Column." They are referred to in the table of the area of furnace bars in various types of boiler, page 293, *ante*.

FIG.56.

FIG 57

FIG.58.

## *OBITUARY.*

MR. E. H. BURNELL.—We regret that we have to announce the somewhat sudden death of Mr. Edward H. Burnell, F.R.I.B.A., of Bedford-row, W.C., which occurred on the 5th inst. at his residence, 15, Orsett-terrace, Hyde-park. Mr. Burnell carried on for many years an extensive practice as a surveyor in the metropolis and elsewhere. He was the senior member of the Surveyors' Association, and for many years its secretary, and only nine months ago he retired from his appointment as Surveyor to the Skinners' Company, on the ground of failing health, after having filled that office for nearly thirty years. On his retirement the Company unanimously voted him a large retiring pension. He was elected a Fellow of the Institute of Architects in 1877.

## *GENERAL BUILDING NEWS.*

LINCOLN CATHEDRAL.—We hear from Lincoln that the committee appointed to consider the form which the proposed memorial to the late Sir Charles Anderson should take, have unanimously decided in favour of the restoration of the chantry chapel of Bishop Fleming in the north aisle of the retrochoir of the Minster. Bishop Fleming died in 1431, but, according to the fashion of the day, his chantry was erected and his monument executed previous to his death. It is a good specimen of Early Perpendicular, having three windows to the north, with rich buttresses and parapets and panelled work. But the whole has been long in a miserable state of squalor and decay, reflecting little credit on the members of Lincoln College, Oxford, of which Fleming was the founder. The proposed work may be a good one in itself, but we fail to see the appropriateness of the restoration of one man's chantry chapel as a memorial to another, at the distance of four centuries and a half, and we shall be curious to know in what way it will be identified with Sir Charles Anderson. The restoration, if done at all, should have been taken in hand by Lincoln College, "in priam fundatoris memoriam."

POOR LAW BUILDINGS, CROYDON.—The foundation stone of the new Board room, offices, and out-relief station for the Croydon Union was laid on the 5th inst. by Mr. J. Farley, Chairman of the Board of Guardians. The architect is Mr. Fredk. West, of Croydon, and the contractor Mr. Alfred Bullock, also of Croydon. The cost of the building will be about 6,500*l*.

HOSPITAL FOR CONSUMPTION, MANCHESTER.—On the 30th ult. the new out-patient department of the Manchester Hospital for Consumption and Diseases of the Throat and Chest was opened by Miss Balfour. The building is situate in Hardman-street, Deansgate. It is twice the size of the former one, which occupied a portion of the same site. The new waiting-hall (capable of seating 200 patients), the entrance to which is from Hardman-street, is 40 ft. by 40 ft. It is lighted by an octagonal dome 30 ft. in height, which terminates in a turret for the extraction of vitiated air. Round the hall are grouped nine consulting and examination rooms, each having double doors and windows. The new dispensary is placed at the junction of Byrom-street with Byrom-place. There is also a patients' exit therefrom into Byrom-street. Fresh air is admitted into the basement, and after passing over hot-water coils, is driven through underground flues to the various rooms by a fan, the motive power being supplied by a gas-engine. The work has been executed by Messrs. Wilson & Toft, of Hulme, from the designs and under the superintendence of Messrs. Pennington & Bridgen, architects, at a cost of upwards of 2,500*l*.

WESLEYAN CHURCH, WOLVERTON. — The foundation-stones of the new Wesleyan Church which is being erected at Wolverton, North Bucks, were laid on the 2nd inst. The new building will seat about 550 persons, and will involve an outlay of 2,300*l*. The style is Early English, and the architect is Mr. Ewen Harper, of Birmingham, and the builders Messrs. H. & C. Burden, of Chipping Norton.

CLUB BUILDINGS, GLASGOW.—The plans of the new Conservative club-house to be erected at the corner of Bothwell and Wellington-streets, Glasgow, were on the 31st ult. passed by the Dean of Guild Court. The drawings have been prepared by Mr. R. W. Edis, architect, London. The external design of the building is Scotch Rennaissance, freely treated, with projecting bays and oriels, and crows'-feet gables, flanked by small turrets. The main entrance in Bothwell-street is flanked with red granite columns. This entrance is on the street level, and leads into an outer hall, from which access is gained to the main ground floor level by a flight of steps. On this floor are the morning or reading-room, 46 ft. by 25 ft., facing Bothwell-street, with two bay windows; the dining-room, 73 ft. by 25 ft., with the usual service arrangements communicating with the kitchen, still-room, &c., and the lavatories and cloak-rooms. On the first floor is a smoking-room, 70 ft. by 25 ft., fronting Bothwell-street, with three bay windows. Fronting Wellington-street is a library, and private billiard and dining-rooms. On the second floor, above the smoking-room, is the billiard-room, also 70 ft. by 25 ft., and a card-room. There are twenty-five bed-rooms for the use of the members, and, in addition, there are dressing and bath-rooms on a mezzanine floor. In the basement is the kitchen, with a ceiling 22 ft. high, also the servants' hall, sitting-rooms for the maids and men servants, wine cellars, &c. On the mezzanine floor above the basement are the steward's office, close to the servants' and tradesmen's entrance in Wellington-street, housekeeper's rooms, still-room, and still-room maids' sitting-room, upper servants' dining-room, men servants' dormitories, &c. The building is to be of brick, faced with red sandstone, and it is proposed that all the floors shall be of fireproof construction, and all partitions to be of brick and cement.

RESTORATION OF ALL SAINTS' CHUCH, HILTON, DORSET.—On the 28th ult. the Church of All Saints', Hilton, Dorset, was re-opened after restoration. The architect for the restoration states that the principal works that have been carried out under the present restoration are the taking down and rebuilding, stone by stone, as before, the whole of the south arcade and the wall of the south aisle as far as the porch. The shoring up of the chancel arch and south wall, &c., to allow the rebuilding of the pier on the south side of the chancel arch, which was crippled and out of the upright. In carrying out this work the pier was found to have contained the steps which formerly led to the rood-loft. The masonry of this pier was in a very unsafe condition, partly from the removal of the ground under the foundations in the formation of vaults and graves to a depth of nearly 6 ft., and also on account of the alterations that have taken place in it at various times. The original openings, at the bottom and top of the staircase, seem to have been walled up, and two more (doorway) openings found, one on the south side of the pier leading from the south transept and one on the west side of the pier, the cell of which was about 3 ft. 6 in. from the floor. All four openings were, when found, walled up, and also the interior of the pier, with solid masonry. All four doorways have now been opened out, and provision made for the stability of the pier by inserting slabs of stone to bond it together, and, in order to obtain a sufficiently firm footing, it was necessary to go down to a depth of 6 ft. below the floor of the church. The perpendicular roofs of the north and south aisles have been reconstructed and restored, care having been taken to preserve and work in again all the old timber that was sound enough to leave. A new open hammer-beam roof of pitch-pine replaces the former roof of the nave, which had a round plaster ceiling, and which was erected about 100 years ago. None of the oak of the original nave roof was found. During the progress of the works a few fragments of Norman architecture have been found. The tower arch has been repaired and made good, where it had been cut away and mutilated for the housing of the gallery timbers. The font, which was formerly placed under the gallery, has been cleaned and repaired, and refixed in the centre of the tower, the walls of which have been pointed and made good, and an ornamental tile floor laid down. The panel paintings of Apostles and Saints, which were before fixed on the north and south walls of the chancel, have been cleaned and placed in oak frames, and refixed on the north and south walls of the tower. The whole of the floors of the nave, aisles, and vestry have been re-laid with pitch-pine block flooring on a bed of concrete. The church has been re-seated with pitch-pine framed open seats. The old pulpit has been cleaned, and the carved panels repaired, and the moulded stone base, which was before buried under the floor, replaced, and the pulpit again fixed on it. A new vestry, with heating chamber under it, has been built on the north side of the tower. The exterior masonry of the church has been repaired and made good. The missing parapet, &c., on the north aisle restored, and the defective gargoyles replaced. The south porch, which projects into the church, has been made good, the floor laid with tiles, and the roof renewed. The porch has a ground roof of Ham Hill stone, and on two of the bosses, at the intersections of the ribs of the tracery, are carved the arms of Milton Abbey and the arms of Abbotsbury. On removing the ivy from off the wall of the south aisle to take it down, certain ornamental panels, with initials cut in them, were found. These have all been replaced as near as possible in the position in which they were found. At the south-east angle of the parapet on the south aisle was fixed a stone sundial, bearing the date 1695. This has been re-fixed in its original position. The roofs of the aisles have been covered with lead,

resting on false roofs, raised above the old oak ceilings. The masonry of the tower has been repaired, and the defective stonework made good. The windows of the south aisle and transept and west window of tower have been filled in with new cathedral glazing. The church has been heated with hot-water apparatus by Mr. Pond, of Blandford. The chancel of the church has also been restored by the Ecclesiastical Commissioners, and a new open-timber roof fixed, the chancel fitted up with oak reading-desks and choir-benches, and the floor paved with tiles. This part of the work has been done under the direction of Mr. Ewan Christian, the Architect to the Ecclesiastical Commissioners. The whole of the work to the nave, aisles, &c., has been carried out by Messrs. Merrick & Son, of Glastonbury, and under the direction of Mr. Walter J. Fletcher, F.R.I.B.A., of Wimborne.

RESTORATION OF THE OLD CHURCH OF HADDINGTON.—The restoration of the Old Church of Haddington, which has been in progress for the last eighteen months, is, says the *Scotsman*, now all but complete. The church is built on the cruciform plan, with aisles in nave and chancel. When the proposed restoration of the building was under consideration about a couple of years ago, it was proposed not only to restore the nave, but also the now ruinous portion of the structure,—the chancel and transepts. Owing chiefly to the large expenditure involved, the restoration of the nave was alone proceeded with. The building is an example of Late Ecclesiastical Scottish Gothic. In the work of restoration, it was necessary to begin with the flooring, which has now been brought to such a level as to admit of the bases of the old pillars being exposed to view. The former galleries, which were placed round three sides of the nave, have disappeared, and also the old box-like pews and high wooden pulpit. The former entrances on the north side of the nave, which were alterations on the original building, have been closed up, and access to the church is now obtained by the west doorway, and by a new doorway in the east wall immediately below the central tower. These doorways open into porches enclosed with oak screenwork. In the north-east corner of the nave a small robing-room or vestry is screened off by oak-work. Had it been possible, galleries would probably have been done away with altogether in the restored building; but it was found that, without the extra accommodation which they provided, the requisite number of sittings could not be obtained. This accounts for the existence of an east and west gallery in the restored church. That at the west-end, above which is a large stained-glass window, is devoted to the purposes of sittings; the other, which is on a smaller scale, is partly for the accommodation of the choir and of the organ, with which the church will for the first time be provided. The supporting beams of the galleries rest on stone corbels with carved foliage, inserted into the nave pillars and walls. The sockets are divided into moulded panels, while the gallery fronts are of oak, enriched with tracery, niches, and carved foliage. Both galleries are reached by oak stairs, and the east gallery is so designed that part of it overhangs, as a canopy, the marble platform on which the Communion-table stands. The church, which will accommodate about 1,000, has been reseated in modern style. Open oak-benches have been substituted for the former square pews. The nave is laid with encaustic tiles, while the remaining portion of the floor is laid with wood-blocks on a foundation of cement and asphalt. All the old plaster work has been cleared off the walls, and the paint has been removed from the pillar, the walls having been pointed and repaired where necessary. It was found that nothing could be done to alter the construction of the plaster ceiling, which, however, has been coloured in a tone corresponding with the walls. The pulpit stands next the north-east pillar of the nave, and the font occupies a corresponding position on the south side. They are executed in polished Corncockle stone. The pulpit rests on six polished red marble shafts, which rest on a circular disc. It is entered by a staircase which curves round the old pillar, and is enriched with perforated tracery, railing, and carved newels. The platform under the east gallery on which the Communion table stands is of polished red marble, and the steps to it are of marble. The table rests on carved pillars. The font, placed near the south-east pillar, rests on two flights of steps in octagonal form, and has polished marble shafts, arches, and carved foliage. The lectern is a carved stone pillar with a spreading carved base and capital, and twisted wreath. On the top of this shaft, and serving as a book-rest, is a polished brass eagle moulded by Mr. Starkie Gardner, of London. The pulpit, font, lectern, and communion table were executed by Mr. W. Birnie Rhind, sculptor. The organ will have an oak case in keeping with the gallery fronts, and enriched with crocketted pinnacles, tracery, and carving. The heating of the building is by small pipes on the high-pressure system, and provision has been made for lighting the church by gas. Two gifts of stained glass windows have already been intimated, and the restoration of the large window in the south transept is now being proceeded with. The designing of the whole work was entrusted to Messrs. Hay & Henderson, architects, Edinburgh. During the progress of the restoration, a doorway leading from the south-east isle to the turret, giving access to the roof, was discovered. The doorway has been carefully restored, and is now in use. Messrs. W. & J. Kirkwood, Edinburgh, were the principal contractors, and Mr. Laird acted as clerk of works.

NEW COURT-HOUSE, BIRKDALE, LANCASHIRE.—On the 7th inst. the new court-house which has been erected in Weld-road, Birkdale, by the County Council, was formally opened. The building is in the English Renaissance style, and is constructed of brick, freely relieved with carved stone panels and cornices. Divided into three blocks, the administrative block occupies the centre, on the south side of which is the house for the inspector, while on the north side is the sergeant's house. The central block contains, on the ground floor, charge-office, constables' day-room, and four cells; and on the first floor are the magistrates' room, apartments for solicitors and witnesses, and a court-room, 40 ft. long by 28 ft. wide, with accommodation for nine magistrates. The building was erected from the designs of Mr. William Verity, architect, Wigan, and the contractor was Mr. George Johnson, Seaforth.

CO-OPERATIVE PREMISES, JARROW.—On the 26th ult. new co-operative premises, which have been erected at the corner of North-street and Market-square, Jarrow, were opened. The new premises occupy the site of the old stores, together with that of two dwelling-houses, and cover an area of about 5,227 superficial ft. They are four stories in height, and contain on the ground floor six shops. On the first floor are flour and grocery warehouse and tea-room, work-rooms for tailors, milliners, and shoemakers, and also a large millinery show-room. There are also cellars in the basement. Communication between the different departments has been provided by staircases and corridors; lifts and hoists being also fixed in various positions. The lecture-hall on the second floor is 84 ft. by 36 ft., and 25 ft. high, and will accommodate between 600 and 700 people. The building is warmed throughout by a low-pressure hot-water heating apparatus, fitted by Messrs. Dinning & Cooke, of Newcastle. The building is to be lighted by electricity. The dynamo will be driven by a 16 horse-power gas-engine, which will also work the hoists, lifts, and other machinery about the premises. The building, which is of red Normandy bricks with Denwick stone dressings, is Renaissance in character, and has on the North-street side a clock-tower about 65 ft. in height. The total cost of the building will be upwards of 7,000*l.* Mr. Pringle, of Gateshead, was the contractor. The electric lighting has been entrusted to Messrs. King, Brown, & Co., of Edinburgh, and was carried out under the superintendence of Mr. Alfred Flood; the plumbing and sanitary work, together with the tiling, by Messrs. Tweddle & Co., of Newcastle. The plastering and painting have been in the hands of Messrs. Dodds and Hopper, respectively, both of Jarrow; Mr. George Gordon acting as clerk of works. The whole of the work has been carried out from the plan, and under the supervision, of the architect, Mr. J. Walter Hanson, of Jarrow.

PROPOSED RESTORATION OF BRISTOL CATHEDRAL.—According to the *Bristol Times and Mirror*, the Dean and Chapter of Bristol Cathedral have been considering matters relative to the restoration of the Cathedral. It has been decided to take in hand at once the restoration of the Cathedral as a whole, and not do the work in sections. The plan to be adopted is that of the late Mr. Street, and it is to be carried out under the direction of Mr. Pearson. It embraces the restoration of the central tower, the lady chapel, the re-arrangement of the whole of the choir, involving the restoration of the older lady chapel, and a new organ, that is to be divided, and not to be placed on the screen. An approximate estimate of the cost which Mr. Pearson has furnished is 20,000*l.* Another matter to be taken in hand is the transformation of an apartment at the south end of the cloisters into a vestry for the minor canons, for which work separate estimates have been received.

## *FOREIGN AND COLONIAL.*

FRANCE.—The Government will shortly give commissions for bronze statues of the following men: Vergniand, Danton, Casimir-Perier, Ledru-Rollin, and Gambetta. These statues which have been asked for by the Bureau of the Chamber of Deputies, will ornament the Committee-room of the Bourbon Palace, where M. Dalou's bas-relief of Mirabeau and the tiers-etat is.——The large room in the Court of Appeal has just been opened. It was begun by M. Coquart and finished by M. Paul B'ondel, who, after the ceremony was presented with the Legion of Honour.——M. Adrien Moreau artist, has also been decorated on the occasion of the Exhibition of Pastellites.——The jury of architecture is composed as follows, for the Salon des Champs Elysées: MM. Coquart, Pascal, Garnier, Raulin, Daumet, Ginain, Guadet, Mayeux, Normand, Loviot, Vaudremer, Corroyer—supplementary jurors, MM. Ancelet and Paulin.——The administration is going to ask the Municipal Council for the necessary funds to carry out the restoration of the Church of St. Eustache, which is one of the most beautiful specimens of the Renaissance. It is calculated that it will require about 430,000 franc to restore it thoroughly.——An interesting e hibition of the works of Mdlle. Abbéma is announced, to be held in the Galerie Georges Petit.—— The Municipal Council have just voted the necessary sum for the construction of a bridge over the Seine, between the Pont de Greville and the viaduct of the Pont du Jour. This bridge will connect the quarters of Auteuil and Javel, and will be called the "Pont Mirabeau."——The sculptor Fremiet, the decorator Jambon, and the medal-engraver, Chaplain, have just been elected members of the Commission for the decoration of the Hôtel de Ville, in place of MM. Chapu, Lavastre, and Bailly deceased.——The sculptor Etienne Leroux has lately finished a statue of Surcouf, the celebrated sailor, which is to be placed in the town of St. Malo.——The military authorities are proposing to demolish the old fortifications of Lille, which extend from the Porte St. André to the Porte de Louis XIV. The existin enclosures and the moats are to be replaced by a simple wall with a moat and slope, which will allow the construction of a large exterior boulevard, thus giving light and air to the old quarters of this populous town. In consequence of this plan there will be several large works commenced, namely, the enlargement of the Hospital St. Sauveur, the General Hospital, two large barracks, and the station of the Chemin-de-fer du Nord.——A monument to Dr. Coste is to be inaugurated this week a Villes-en-Michaille (Ain). He was chief surgeon in the army during the war of the American Independence and the first Revolution.——M. Martel, senator and late minister, has just left a most important artistic collection to the town of St. Omer.——The permanent exhibitions of local works of art at Rouen have not been satisfactory during the last two years. The committee have, therefore, decided not to hold them any longer.——The late Duc de Trevise has left to the town of Ajaccio, in Corsica, an interesting collection of works of art and historical souvenirs of the time of Napoleon.——An exhibition of modern decorative art of Lorraine is in course of preparation at Nancy.——The death of M. Thomas de Barbarin is announced as having taken place in Paris at the age of seventy-one years. He was a pupil of Delaroche and Scheffer. Since 1846 he has annually exhibited in the Salon.——A young artist of considerable talent, M. Charles Armand Etienne Thomas, has died in Paris, aged thirty-six. He confined himself principally to landscapes and flowers, and had been a pupil of Leclaire. He had obtained a medal of the third class in 1886 for a beautiful composition, entitled "Veille de Fête," bought by the town of Havre. He obtained an honourable mention in the Universal Exhibition of 1889.——We have to notice the death of M. Jules Louis Haro, at the age of thirty-nine. He had studied painting with M. Carolus Duran, and engraving with M. Hedouin. He was an artist from whom much was expected.

SWEDEN AND DENMARK.—At the last meeting of the Swedish Slöjd, or Handicraft Society, Herr E. G. Folcker read a paper on English wall-papers, illustrated by numerous specimens of such.——The proposal to sell the two wings of the Norwegian Ministerial Hotel in Stockholm for building purposes is strongly disapproved by a committee appointed to examine into the matter. The building is one of the most imposing in the Swedish capital.——A fine new thoroughfare is in course of construction, running right through the city from the Nybrovik to the Träsk Market. Its construction involves the demolition of numerous unsightly "rookeries."——King Oscar has presented to the National Library the valuable and copiously-illustrated work "Handbuch der Architektur," by Prof. J. Durm, of Carlsruhe.——The leading land-owning associations of Copenhagen have framed a grand scheme for the rebuilding of a large portion of the old town and the construction of a wide new avenue right through the city.

## *MISCELLANEOUS.*

THE PROJECTED NEW RAILWAY TO LONDON.—The Committee of the House of Commons on the proposed extension of the Manchester, Sheffield, and Lincolnshire Railway to London met on Tuesday last, when, after hearing further evidence, the room was cleared and the Committee deliberated. On the readmission of the counsel and parties, the Chairman (Sir Richard Paget) stated (says the *Times* report) that the Committee were unanimously of opinion that the preamble of the Bill was proved, but that, as there were certain incidental matters which would have to be discussed,—such as the report of the Home Office upon the rehousing of the displaced working-class population (the recommendations upon which point the Committee were inclined to accept), together with the reports of the Local Government Board and of the Commissioners of Woods and Forests,—the Committee would adjourn until April 28, in the hope that nearly all the matters referred to might be satisfactorily arranged in the interval.

# COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

| Nature of Work. | By whom Advertised. | Premium. | Designs to be delivered. |
|---|---|---|---|
| *Valuation of Property | Stockport Union | ..... | May 2 |
| *Town Hall and Public Offices | Llanelly Loc. Bd. | 50 and 20 guineas | June 18 |
| *Barrett-Browning Memorial Clock Tower and Institute, Ledbury | The Committee | 20*l.* 10*l.* | No date |

## CONTRACTS.

| Nature of Work or Materials. | By whom Required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. |
|---|---|---|---|
| *Dwelling, Stores, &c. at Lighthouse, Gibraltar | Corp. of Trinity House | *Official* | April 16 |
| Sewerage Works, Harthill | Worksop U.R.S.A. | W. T. Brown | April 19 |
| Road Materials (2,500 yds.) | Penarth Local Board | J. Court | do. |
| Additions to School, West Haddon, Northampton | G. Harday | ..... | April 20 |
| Dwelling-house, Low Dryburn, Durham | J. F. Bell | W. Cook | do. |
| Cooperage Works, Blackfriars-road, Elgin, N.B. | G. Gorrod | ..... | April 21 |
| Five Dwelling-houses, Crownhill, near Plymouth | S. Revell | J. H. Keats | do. |
| *Broken Guernsey Granite | Vestry of St. Matthew, Bethnal Green | *Official* | do. |
| Wesleyan Chapel, Stockdale Wath, Cumberland | Wm. Gibson | ..... | April 22 |
| Brass Foundry and Workshop, Pellon-lane, Halifax | ..... | Lloyd & Sons | do. |
| *New Roads, Sewers, &c. Surbiton | ..... | S. Mather | do. |
| Chapel, Gates, Walls, &c. Cemetery | Abergavenny Bur. Bd. | E. A Johnson | April 23 |
| *Building Manholes, Supply of Granite, &c. | Mortlake Dist. Highway Board | H. Richards | do. |
| Tower (2nd portion) of Church, Irthlingborough, Northants | Rev. E. Biscoe | Talbot-Brown & Fisher | April 24 |
| Street Work | Warrington T. C. | T. Longdin | April 25 |
| Roadmaking and Draining | Hanley Town Council | J. Lobley | do. |
| *Asphalte Paving | Portsmouth U. S. A. | *Official* | do. |
| *New Sewer in Old Change | Commrs. of Sewers | do. | April 26 |
| *Painters' and Plumbers' Work | do. | do. | do. |
| *Engineers' Work | do. | do. | do. |
| *Carpenters' Work | do | do. | do. |
| *Paving Works | Willesden Local Board | O. Claude Robson | do. |
| *Labourers' Dwellings | Manchester Corp. | J. Allison | do. |
| Brick Sewer | Halifax Corporation | E. R. S. Escott | April 27 |
| *Taking Down and Re-building Kingsford Bridge | Essex County Council | P. J. Sheldon | do. |

## CONTRACTS.—*Continued.*

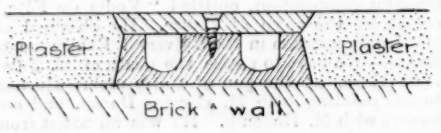
| Nature of Work or Materials. | By whom Required. | Architect, Surveyor or Engineer. | Tenders to be delivered. |
|---|---|---|---|
| *Postal Sorting Office, Sheffield | Com. of H.M. Works | *Official* | April 27 |
| Widening Viaduct over River Taff, Cardiff | G. W. R. | do. | do. |
| *New Lighthouse, Withernsea | Corp. of Trinity House | do. | April 28 |
| *Police Station, Courts, Offices, &c. | Blackpool Corp. | J. Wolstenholme | do. |
| *Foundations of Block I., Record Office Extension | Com. of H M. Works | *Official* | April 29 |
| *Roadmaking Works, Drains, &c. | Tonbridge U.R.S.A. | W. Oakley | do. |
| Additions to School, near Cardiff | Pentyrch Sch. Bd. | Bruce Vaughan | April 30 |
| *Wrought-iron Railings | Islington Vestry | J. P. Barber | May 2 |
| *Stoneware Pipe Sewer | do. | do. | do. |
| *Making-up Part of Pinner-road | Harrow Loc. Bd. | E. R. Capon | May 3 |
| *Entrance Gates and Iron Railings | Bristol S.A. | F. Ashmead | May 4 |
| *Refitting Bath-rooms, &c. Western Fever Hospital | Metro. Asylums Bd. | A. & C. Harston | do. |
| *Two Shops and Five Houses, Hammersmith | ..... | F. & W. Stocker | do |
| *Painting and Decorating Part of Town Hall | Leeds Corporation | T. Hewson | May 5 |
| *Alteration at Cane Hill Asylum | London County Council Asylums Committee | *Official* | May 9 |
| School Buildings, Broughton, Kettering | ..... | Hart & Dawson | No date |
| House, &c. Reay Garth, Gilsland, Carlisle | ..... | T. Taylor Scott | do. |
| Rebuilding "Belmont," Exeter | R. B. West | E. H. Harbottle | do. |
| Dwelling-house and Shop, Stanley, co. Durham | ..... | ..... | do. |
| New Schools, Tanfield Lea, Newcastle | J. W. Moffitt | E. F. W. Liddle | do. |
| Weaving Sheds, Brompton, Northallerton | Tanfield Sch. Bd. | Davidson & Kendle | do. |
| Theatre, Mexborough, Sheffield | W. & J. Pattison | Thos. Winn | do. |
| Six Dwelling-houses, Hesley Bar, Thorpe Hesley | ..... | Geo. White | do. |
| *Temporary Iron Building | Wm. Mallinson | ..... | do. |
| Road-work, Cogan & Llandough | Sch. Bd. for London | *Official* | do. |
| Alterations, "Old Fleece Inn," Gateshead | Penarth Loc. Bd. | J. Court | do. |
| | White & Bennett | B. F. Simpson | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. |
|---|---|---|---|
| *Builder's Clerk | Westminster Vestry | 100*l.* | April 20 |
| *Borough Engineer | Salford Corp. | 500*l.* | April 23 |
| *Assistant Borough Surveyor | Borough of Maidstone | 2*l.* | do. |
| *Clerk of Works | Pwllheli Corp. | Not stated | April 28 |
| *Office Assistant | Lambeth Vestry | 2*l.* | April 30 |
| *Three District Superintendents | do. | 3*l.* 3*s.* | do. |

*Those marked with an Asterisk (*) are advertised in this Number.* *Competitions*, p. iv. *Contracts*, pp. iv., vi., & viii. *Public Appointments*, p. xviii. & xix.

A "KEYED" CASING FOR ELECTRIC-LIGHT WIRES.—The accompanying gives the section of a new construction of electric-light casing, which has been registered by Mr. George G. Sarney. It will be seen that when the casing is used on the walls of buildings, and fixed flush with the plaster, the capping acts as a "key" for it. When so fixed, should it be necessary to look to, or alter the wires, the capping can easily be removed without breaking away the edges of the plaster. In buildings in the




course of erection the casing would serve as a ground for plasterers to gauge to, and it is claimed that it would also prove useful and economical to contractors when wiring buildings after the plastering has been finished; because the chases cut in the walls can be so much smaller than when ordinary casing is used.

CORNWALL COUNTY COUNCIL.—Mr. Silvanus Trevail, architect, has been re-elected Chairman of the County Sanitary Committee, the headquarters of which is to be located at Truro. The Housing of the Working Classes Act, 1890, and othef sanitary legislation was under the consideration or the Committee, with the result that it was decided to again call the attention of the various Medical Officers of Health and Sanitary Inspectors of the county to the new duties imposed upon them by these Acts. It was also decided for the Chairman to proceed with the digest of the various medical officers' annual reports preparatory to the June meeting of the County Council.

SANITARY SPECIALITIES AT CHELSEA.—Messrs. Thomas Crapper & Co., of Marlborough-road, Chelsea, have just completed some extensive additions and improvements at their works. The additions include an admirably-lighted and arranged workshop for brass-finishing, &c., the lathes being driven by an 8 horse-power "Otto" gas-engine. There is also a new and very complete foundry for brass, gun-metal, and other castings, and a considerable addition of warehouse room, so that the firm are able to keep in stock a large supply of sheet-lead, pipe, traps, sanitary stoneware and white ware, rain-water goods, closets, urinals, lavatories, &c. In addition, Messrs. Crapper & Co. have been able to materially enlarge their showrooms, enabling them to readily demonstrate the good points of many of their specialities. Amongst these we may single out for special mention the "Kenon" disconnecting trap, which we described in a former volume of the *Builder*; an improved patent self-rising closet-seat, specially adapted for a closet used also as a slop-receiver; an improved and really "silent-syphon" water-waste preventer, fitted with Rawlings's patent silencing air-tubes,—an invention of much merit; and a new pedestal-closet with patent lead connexion, which seems to merit attention.

RELATIVE WEAR OF VARIOUS FLOOR MATERIALS.—According to the *Thonind Zeitung*, some recent tests with various floor materials as to their relative resistance to wear have resulted as follows:—

| | Co-efficiency of Wear. |
|---|---|
| Basalt | 7·1 |
| Porphyry | 6·7 |
| Granite | 8·3 |
| White marble | 24·4 |
| White sandstone | 72·7 |
| Parquetry slabs from G. Behne, Magdeburg | 15·3 |
| Plaster composition by "Rabitz" patent | 49·2 |
| Portland cement: One part cement to one part normal sand | 15·3 |
| One ditto to two ditto | 17·1 |
| One ditto to three ditto | 32·4 |
| One ditto to four ditto | 53·1 |
| One ditto to five ditto | 124·2 |

It would, therefore, appear that a mixture of cement and sand constitutes the most enduring of floor materials. It should be added that the above tests were carried out on a cast-iron disc coated with emery dust.

LONDON SCHOOL BOARD *v.* CHARLES WALL.—The above action was referred to Mr. Macvicar Anderson, who has just awarded the School Board 208*l.* for deviations made by the contractor in the erection of the Flora Gardens Schools at Hammersmith. The arbitrator decided that each party should pay their own costs.

SURVEYORSHIP, BOOTLE.—We understand that Mr. J. A. Crowther, Borough Surveyor of Nelson, has just been appointed by the Streets and Buildings Committee of the Corporation of Bootle as surveyor of that borough. The salary attached to the office is 350*l.* per annum. There were ninety-three applications for the vacant office.

THE RAILWAYS OF THE WORLD.—According to the *Almanach de Gotha*, the total length of the railways open for traffic at the end of last year was 221,534 kilomètres, Germany heading the list with 43,008 kilomètres, France following with 36,697 kilomètres, and Great Britain third with 32,304 kilomètres, whilst the smallest railway net is that of Greece, viz., 602 kilomètres. The average length of railway in Europe per 1,000,000 inhabitants is 642 kilomètres, and the average length per 1,000 square kilomètres, 1,000 kilomètres. Germany possesses 71 kilomètres of railway per 1,000 square kilomètres of area, and 999 kilomètres per 1,000,000 inhabitants; whilst France comes next, with 71 kilomètres and 939 kilomètres respectively, Great Britain being third with 102 kilomètres and 862 kilomètres. Norway comes last as regards length of railway and size of country, viz., 417 kilomètres per 1,000 square kilomètres, but stands comparatively high in proportion to population, viz., 723 kilomètres per 1,000,000 inhabitants. The United States possesses 260,000 kilomètres of railway, although having only 63,000,000 inhabitants, as against 221,000 kilomètres to 345,000,000 inhabitants in Europe, making no less than 4,127 kilomètres per 1,000,000 inhabitants, and 34 kilomètres per 1,000 square kilomètres of area.

THE EUPHRATES VALLEY RAILWAY.—A syndicate of German, French, and Austrian financiers has applied to the Sultan for a concession for a railway from Scutari to Bagdad through the Euphrates Valley, with an eventual extension to the Persian Gul. and India. The cost of the former railway is estimated at about 12,000,000*l.*

## MEETINGS.

WEDNESDAY, APRIL 20.

*British Archæological Association.*—(1) Miss Russell on "A Discovery in Rome in Relation to Mythology in Britain." (2) Mr. H. Syer Cuming on "The Hog's Head: The Nuptial Cup of Sussex." 8 p.m.

*Royal Meteorological Society.*—Mr. W. H. Dines on "Anemometer Comparisons." 7 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Quarterly meeting of the members. 8.30 p.m.

FRIDAY, APRIL 22.

*Institution of Civil Engineers (Students' Meeting).*—Mr. E. L. Hill on "The Speed and Power of Locomotives." 7.30 p.m.

SATURDAY, APRIL 23.

*Society of Antiquaries.*—Anniversary meeting. 2 p.m.

*Edinburgh Architectural Association.*—Visit to Callender House.

## RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

7,432.—BRICK-MOULDING MACHINERY: *E. Breething.*—This invention relates to improvements in machinery for moulding bricks. In order to compress clay into the moulds, each mould as it is to be filled, is brought below an opening in the bottom of a box within which a plunger works, which is forced down when the mould is below the opening. When the plunger is raised a slide at one side of the box is lifted to open a communication from a pug-mill, or other clay-expressing machinery, and allow the box to be filled with clay. As the plunger commences to descend the slide is quickly closed, and the clay within the box is forced downwards by the plunger and into the mould, its return to the pug-mill being shut off by the slide. All excess of clay forced downwards is allowed to pass from the bottom of the box to the bottom of a second, or pressure-relieving, box, fitted with a heavily-weighted plunger. When the plunger of the pressing-box again rises, the clay in the second box is, by the action of the heavily-weighted plunger, forced back from it into the pressing-box, or, if the weight of the plunger is insufficient to force the clay back, it is forced downwards by a positive movement. An arrangement is provided to prevent injury to the moulds from stones in the box. The specification contains a full description of the construction of the moulds.

7,695.—SIZE PAINT: *A. J. Boult.*—The subject of this patent is an improved paint, claimed to combine the

advantages of good quality and economy in cost, fit for use in any weather, and not liable to scale off. It consists of wheat-flour, alum, and water in the following proportions:—1 kilogramme of wheat-flour, boiled as when used for making ordinary size, 20 litres of water, and 50 grammes of alum dissolved in 2 litres of water.

7,727.—DIVIDABLE TILES: *D. & F. Platt.*—This invention relates to an improved metallic die for use in forming dividable tiles of earthenware, cement, composition, or other suitable material, and has for its object the construction of a die in such a manner that tiles made by the use of the die will have an insertion or insertions cut in them, crossing the tile in any desired direction, and of suitable depths in the top and bottom faces of the tile, so that the tiles may be easily divided before or after firing without chipping or damaging their back or front faces. Each die is made in two parts, a top and bottom portion. To the face of each portion is attached, by any suitable means, a metallic blade or plate of suitable shape and size, vertical to the face of the die, so that these plates, when the dies are attached to a suitable press, and used for making dividable tiles, will cut or form an insertion in both the front and back faces of the tile.

9,312.—VENTILATING TUBES: *G. Brown.*—This is an invention relating to inlet-ventilators of the description known as "Tobin tubes," designed with the object of applying to the flap or valve of the ventilator an indicator showing whether the apparatus is open or closed. It consists essentially of a combination of the valve or valve-spindle with a disc or plate inscribed with the words "open" and "shut," or others of a similar import, and a hollow plate or cover with a slot or slit to display the words or marks inscribed on the disc or plate.

1,062.—CHIMNEYS: *J. M. Barber.*—This specification relates to an improved device for the cure of smoky chimneys and the prevention of down-draught, at the same time increasing the up-draught. The inventor claims to be able to dispense with unsightly chimney-pots and cowls, and to reduce the consumption of coal. These advantages are to be gained by means of a centrally-perforated flanged trapezoidal piece of fire-clay, metal, or the like, fixed at the back of a fire-place just above the register of the stove, so as to allow the register to be opened or closed, as required.

### NEW APPLICATIONS FOR LETTERS PATENT.

*March* 28.—5,973, H. Hodgkinson, Automatic Door Furniture.—5,980, J. Anderson, Automatically Controlling the Ventilators of Greenhouses, &c.—5,984, W. Hoare, Circular Saws.—5,989, A. Taylor, Dressing Stone.—6,009, S De Ferranté and J. Noad, White Lead and Chrome Pigments.

*March* 29.—6,037, T. and W. Starkey, Door-catches for holding doors.—6,042, B. Bloom and A. Kotin, Closing Doors.—6,067, D. France, Fire-grates.—6,080, L. Sagendorph, Metallic Facings for Buildings.—6,091, H. Newton, Ventilation of Sewers.—6,104, C. Luther, Cement or Glue for Joining Wood.

*March* 30.—6,136, E. Wild and J. Kent, "In or Out" Indicator for Entrance-hall, &c.—6,146, M. Perrett, Stoves or Fire-places.—6,147, W. Davies, Coin-freed Apparatus for Use in Connexion with Water-closets.

*March* 31.—6,200, J. Merrill, Alternating Valve Mechanism for Flushing.—6,229, J. Kenwood, Soil-pipe Ventilation.—6,242, H. Leigh, Securing Doors and Casements.—6,250, G. Sharp, Fasteners for Doors, Windows, &c.

*April* 1.—C. Gray, Rapid Door-bolt.—6,290, G. Asher, Window-fasteners.—6,331, W. Byers, Fixing Glass in Sashes of Skylights, &c.—6,352, A. Boult, Fasteners for Doors.—6,358, H. Ford, Window-sashes.

*April* 2.—6,408, W. Waghorne, Chimney-cowls.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

1,206, R. Frost, Joints for Pipes and Tubes in Stoneware or Metal.—2,088, H. Penn, Socket-bolts for Doors.—2,094, J. Bolding, Discharging the Contents of Flushing Cisterns, &c.—2,602, W. Sterling and T. Swann, Sanitary and other Pipes, and an improved method of constructing Sewers and Drains.—3,411, C. Formby, Paint-brushes.—4,826, P. Pierpoint, Smoke or Ceiling Protectors for Chandeliers, &c.—5,094, R. Crompton, Linings or Coverings for Walls, &c.—5,291, W. Morton, Ornamental Materials for Decorating Walls, &c.—5,292, W. Morton, Constructing parts of Walls, Partitions, &c.—5,437, C. Wallworth, Wooden Flooring Blocks.

### COMPLETE SPECIFICATIONS ACCEPTED.

*(Open to Opposition for Two Months.)*

6,513, J. Thomson, Ventilation and Distribution of Warmth by Movements of Air.—7,510, R. Marshall and E. FitzGerald, Air Propelling or Ventilating.—7,640, F. Gibbons, Locks of Window-sashes.—2,033, C. Baker and others, Composition Material forming Boards, Slabs, &c. in substitution for Wood or other Materials.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

APRIL 4.—By *P. Hodson*: F.g.r. of 28*l.*, with reversion in 11 yrs., Alfred-pl., Bermondsey, 550*l.*; 9 and 10, Gordon-ter., Wimbledon, u.t. 95 yrs., g.r. 12*l.* 12s., r. 50*l.*, 290*l.*; 1, Newington-cres., Newington, u.t. 20 yrs., g.r. 7*l.*, 170*l.*—By *Chesterton & Sons*: 57, Holland-rd., Kensington, u.t. 69 yrs., g.r. 15*l.*, 800*l.*; 61, Belgrave-rd., Belgravia, u.t. 42 yrs., g.r. 14*l.*, r. 105*l.*, 830*l.*; 64, Inverness-ter., u.t. 55 yrs., g.r. 15*l.*, r. 150*l.*, 1,890*l.*—By *E. Wood*: 51, Greenwood-rd., Hackney, u.t. 59 yrs., g.r. 7*l.*, 370*l.*; 133, Lewisham-rd., Lewisham, u.t. 13 yrs., g.r. 7*l.*, 175*l.*; 38, Stafford-rd., Peckham, f., 250*l.*; 21, Dingwall-rd., Wandsworth, u.t. 96 yrs., g.r. 5*l.*, 150*l.*; 27, Glycena-rd., Lavender-hill, u.t. 82 yrs., g.r. 6*l.*, 245*l.*

APRIL 5.—By *Newton & Long*: 62, Middleton-rd., Dalston, u.t. 47 yrs., g.r. 4*l.*, r. 34*l.*, 275*l.*.—By *W. B. Hallett*: 18, Andover-rd., Holloway, f., r. 26*l.*, 355*l.*—By *Debenham, Tewson, & Co.*: "Les Fleurs," Tooting, u.t. 67 yrs., g.r. 7*l.* 7s., including the lease of garden ground, 570*l.*—By *Ellis & Son*: "Crescent Lodge," The Crescent, Denmark Hill, u.t. 60 yrs., g.r. 15*l.*, 850*l.*—By *Humbert Son, & Flint*: Nos. 3 and 6, Post-office-buildings, Walthamstow, f., 1,645*l.*—By *Montagu & Robinson*; 2, Prince's-st., Spitalfields, f., r. 75*l.*, 1,320*l.*; 131, 133, 201 to 207 (odd), Rommany-rd., Gipsy Hill, u.t. 77 yrs., g.r. 33*l.* 10s., 440*l.*; 214 to 228 (even), Rommany-rd., u.t. 77 yrs., g.r. 44*l.*, 705*l.*; 2141 to 247 (odd), Rommany-rd., u.t. 77 yrs., g.r. 20*l.*, 330*l.*; 119 and 123, Gipsy-rd., u.t. 78 yrs., g.r. 12*l.*, 295*l.*; 125, 127, and 129 Gipsy-rd., u.t. 80 yrs., g.r. 18*l.*, 440*l.*; 163, 165, and 167, Gipsy-rd., u.t. 79 yrs., g.r. 27*l.*, 455*l.*—By *Geo. Goldsmith, Son, & Co*: F.g.r. of 13*l.*, with reversion in 32 yrs., Montpelier-row, Knightsbridge, 380*l.*; f.g.r. of 7*l.* 7s., with ditto in 36 yrs., Montpelier-pl., 210*l.*; f.g.r. of 56*l.*, with ditto in 34 yrs., Montpelier-row, 1,365*l.*; f.g.r. of 5*l.* 10s., with ditto in 32 yrs., 160*l.*; f.g.r. of 6*l.* 10s., with ditto in 35 yrs., 185*l.*; f.g.r. of 26*l.*, with ditto in 34 yrs., 660*l.*; f.g.r. of 49*l.*, with ditto in 35 yrs., Montpelier-pl., 1,405*l.*; f.g.r. of 14*l.* 14s., with ditto in 32 yrs., 460*l.*; f.g.r. of 7*l.* 7s., with ditto in 36 yrs., 245*l.*; f.g.r. of 60*l.*, with ditto in 8 yrs., Rutland-st., 2,170*l.*; f.g.r. of 55*l.* 10s., with ditto in 34 yrs., 1,630*l.*; f.g.r. of 33*l.* 10s., with ditto in 33 yrs., Montpelier-sq., 1,255*l.*; 7, 8, 9, 19, 26, and 27, Montpelier-row, f., r. 199*l.* 13s. 4d., 2,735*l.*; 18, 19, 20, 23, and 25, Montpelier-pl., f., r. 166*l.* 6s. 8d., 2,375*l.*; 26 to 29, Montpelier-pl., f., r. 127*l.*, 1,940*l.*; 6 and 28, Rutland-st., f., r. 63*l.*, 910*l.*; 5, 9, and 10, Montpelier-mews, f., r. 180*l.*, 2,335*l.*; 8, Montpelier-sq., u.t. 32 yrs., g.r. 14*l.* 14s., 975*l.*; 11, Montpelier-sq., u.t. 37 yrs., g.r. 29*l.* 8s., 590*l.*

APRIL 6.—By *Ventom, Bull, & Cooper*:—35 and 37, Priory Pk.-rd., Kilburn, f., r. 73*l.*, 1,000*l.*; 45 and 47, Priory Pk.-rd., f., r. 75*l.*, 980*l.*; 86 to 92 (even), Priory Pk.-rd., f., r, 141*l.*, 1,820*l.*—By *Driver & Perfect*: 8, Hampton-rd., Holloway, f., 360*l.*—By *Rushworth & Stevens*: l.g.r. of 71*l* 8s., Tonbridge-st., Euston-rd., u.t. 14 yrs., g.r. 5*l.*, 425*l.*; 161, Essex-rd., Islington, u.t. 10, g.r. 28*l.*, r. 85*l.*, 305*l.*; 150, Hornsey-rd., Holloway, u.t. 51 yrs., g.r. 8*l.* 8s., r. 40*l.*, 300*l.*; 24 and 26, Lothian-rd., Camberwell, u.t. 68 yrs., g.r. 9*l.*, r. 48*l.*, 400*l.*; 36, Chalcot-cres., Regent's Pk., u.t. 43 yrs., g.r. 8*l.*, r. 42*l.*, 290*l.*—By *Farebrother, Ellis, & Co.*: No. 89, Fleet-st., f., area 1,200 ft., r. 300*l.*, 9,050*l.*—By *T. B. Westacott*: 26, Wrotham-rd., Camden-town, u.t. 59 yrs., g.r. 5*l.*, r. 45*l.*, 420*l.*; 85, Marsden-st., Kentish-town, u.t. 58 yrs., g.r. 6*l.* 6s., r. 45*l.*, 320*l.*; 13 and 14, Preston-st., u.t. 56 yrs., g.r. 11*l.*, r. 67*l.* 12s., 360*l.*; 10, Londesborough-rd., Stoke Newington, u.t. 72 yrs., g.r. 6*l.*, r. 50*l.*, 465*l.*; 15, Grove-pk-rd., Tottenham, u.t. 84 yrs., g.r. 6*l.* 15s., r. 23*l.*, 195*l.*—By *Weston & Sons*: No. 481, Wandsworth-rd., u.t. 30 yrs., no g.r., r. 45*l.*, 520*l.*; 33, 35, 37, 64, and 66, Union-grove, u.t. 32 yrs., g.r. 37*l.*, r. 212*l.*, 1,435*l.*; 47 and 49, Union-grove, u.t. 32 yrs., no g.r., r. 80*l.*, 695*l.*; l.g.r. of 14*l.* 10s., u.t. 32 yrs., g.r. 15s., 210*l.*; 41 and 42, Broad Hinton-rd., Clapham, u.t. 50 yrs., g.r. 9*l.*, r. 56*l.*, 535*l.*; 8, The Grove, u.t. 53 yrs., g.r. 10*l.* 10s., 400*l.*; 143 and 145, Barry-rd., Dulwich, f., r. 52*l.*, 830*l.*; 8, Harold-st., Camberwell, u.t. 76 yrs., g.r. 8*l.*, r. 42*l.*, 375*l.*

APRIL 7.—By *Glover & Harrison*: 10 and 12, Caversham-rd., Kentish Town, u.t. 56 yrs., g.r. 24*l.*, 825*l.*—By *P. H. Clarke*: 18, Charlwood-st., Pimlico, u.t. 33 yrs., g.r. 7*l.* 18s., r. 50*l.*, 430*l.*—By *G. Robins*: 28 and 30, St. Donatt's-rd., New Cross, u.t. 62 yrs., g.r. 8*l.* 10s., 480*l.*—By *Newbon & Co.*: 53 and 55, South-hill-pk., Hampstead, f., 1,065*l.*; 77 and 81, South-hill-pk., f., r. 125*l.*, 1,445*l.*; 3A to 13A (odd), Rectory-rd., Stoke Newington, u.t. 72 yrs., g.r. 63*l.*, 1,000*l.*; 59, Craven-pk., Willesden, u.t. 84 yrs., g.r 10*l.*, r. 55*l.*, 550*l.*; 108 and 110, Forest-rd., Dalston, u.t. 59 yrs., g.r. 12*l.* 16s., r. 76*l.*, 700*l.*; 112 to 118 (even), Forest-rd., u.t. 59 yrs., g.r. 25*l.* 12s., r. 152*l.*, 1,420*l.*; 18, Canonbury-grove, Canonbury, u.t. 26 yrs., g.r. 7*l.*, 315*l.*; 2 and 5, Stewart's-pl., Clerkenwell, u.t. 49 yrs., g.r. 14*l.*, 400*l.*—By *Stimson & Sons*: 85, 87, and 89, Beckway-st., Walworth, f., 1,010*l.*; 56, Hanover-gardens, Kennington, u.t. 53 yrs., g.r. 2*l.*, r. 35*l.*, 330*l.*; 81, Albert-rd., Peckham, u.t. 55 yrs., g.r. 3*l.* 18s. 6d., 200*l.*; 32 and 34, Brayards-rd., u.t. 76 yrs., g.r. 6*l.* 11s., 385*l.*; 10, Russell-grove, Brixton, u.t. 28 yrs., g.r. 5*l.*, 185*l.*—By *S. Chatwood*: "Silver Leys," Broxbourne, u.t. 89 yrs., g.r. 13*l.*, r. 80*l.*, 900*l.*; 100, Blackthorn-st., Bow, u.t. 62 yrs., g.r. 6*l.*, r. 35*l.*, 300*l.*; No. 402, Hornsey-rd., u.t. 60 yrs, g.r. 9*l.*, r. 40*l.*, 150*l.*; four houses and six cottages, High Bridge-st., Waltham Abbey, f., r. 155*l.* 12s., 2,010*l.*; four f. cottages, Barge-yd., r. 23*l.* 18s., 160*l.*; two cottages, North-pl., f., r. 23*l.* 8s., 330*l.*; twelve f. cottages, Romeland, r. 121*l.* 11s., 1,375*l.*; three copyhold houses, r. 35*l.* 2s., 300*l.*; ten f. cottages, r. 112*l.* 9s., 1,640*l.*; f. house and shop, Market-st., r. 20*l.*, 305*l.*; two houses and a cottage, Sewardstone-st., f., r. 35*l.* 2s., 310*l.*; "The Greyhound" public-house and house adjoining, Sun-st., r. 57*l.* 10s., 1,350*l.*; Copyhold house, Sun-st., r. 28*l.*, 350*l.*; Six freehold houses with shops, r. 132*l.*, 2,475*l.*; Freehold house, Sewardstone-road, r. 27*l.*, 520*l.*; Four villa residences, New-road, f., r. 88*l.* 10s., 1,545*l.*; Freehold residence, "The Laurels," 835*l.*: A plot of freehold land, 170*l.*; Two freehold cottages, Honey-lane, 230*l.*; "Harold House," Waltham-lane, f., r. 30*l.*, 500*l.*; Four freehold cottages, Park-lane, Waltham Cross, r. 45*l.* 10s., 330*l.*

APRIL 8.—By *Weatherley & Haslett*: 38 to 44 (even), Union-rd., Clapham-rd., u.t. 70 yrs., g.r. 24*l.*, r. 160*l.*, 1,230*l.*—By *W. W. Jenkinson*: 2 to 10 (even), Upton-lane, Forest-gate, u.t. 88 yrs., g.r. 50*l.* subject to mortgage, 1180*l.*; 252 and 254, Canbury-pk.rd., Kingston-on-Thames, u.t. 77 yrs., g.r. 8*l.*, 270*l.*—By *Woods & Snelling*: 15, Mervan-rd., Brixton, u.t. 81 yrs., g.r. 7*l.*, r. 35*l.*, 310*l.*; 14 and 16, Stanfield-rd., u.t. 78 yrs., g.r. 13*l.*, r. 70*l.*, 595*l.*; 4 and 5, Western-rd., u.t. 72 yrs., g.r. 13*l.* 5s., 585*l.*—By *Hards & Bradly*: 21 and 22, Farwig-lane, Bromley, f., r. 28*l.* 12s., 300*l.*; 2 and 3, Payne-st., Deptford, u.t. 70 yrs., g.r. 3*l.* 8s., 330*l.*—By *Charles & Tubbs*: Moor-lane, City of London, f.g.r. of 340*l.*, with reversion in 72 yrs., 7,200*l.*; f.g.r. of 57*l.* with reversion in 79 yrs., Wimbledon, 1,000*l.*; 1, Bridgewater-sq., Barbican, u.t. 13 yrs., g.r. 29*l.*, r. 114*l.*, 125*l.*—By *Reynolds & Eason*: 91 and 93, Milton-st., City, freehold area 2,052 ft., 3,650*l.*; "Devon House," Devonshire-rd., Greenwich, u.t. 73 yrs., g.r. 4*l.* 10s., 460*l.*; 22, Nailour-st., Islington, u.t. 59 yrs., g.r. 5*l.* 10s., r. 28*l.*, 220*l.*; 22 and 31, Lyon-st., u.t. 52 yrs., g.r. 10*l.*, r. 57*l.* 12s., 425*l.*; 1, Baxter-grove, u.t., 67 yrs., g.r. 3*l.* 10s., 145*l.*; 8, Charles-st., u.t. 60 yrs., g.r. 4*l.* 10s., r. 28*l.*, 280*l.*; 22 and 24, Harcombe-rd., Stoke Newington, u.t., 72 yrs., g.r. 10*l.*, r. 52*l.*, 475*l.*; 3 and 4, Clevedon-rd., u.t. 88 yrs., g.r. 10*l.* 10s., r. 62*l.* 8s., 315*l.*; 45 and 47, Marlborough-rd., Dalston, u.t. 51 yrs., g.r. 7*l.* 10s., 505*l.*; 51 to 59 odd, Parnell-rd., Old Ford, u.t. 70 yrs., g.r. 20*l.*, 620*l.*; 2, Wellesley-rd., Wanstead, freehold, r. 30*l.*, 465*l.*: 35 to 39, Charlotte-st., Shoreditch, f., 1,025*l.*; 69 and 70, Charlotte-st., f., 335*l.*

*[Contractions used in these lists.*—**F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]**

## PRICES CURRENT OF MATERIALS.

| TIMBER. | | |
|---|---|---|
| Greenheart, B.G. | ton | 9/0/0 — 0/0/0 |
| Teak, E.I. | load | 10/0/0 — 15/0/0 |
| Sequoia, U.S.ft.cu. | | 2/3 — 3/0 |
| Ash, Canada | load | 2/10/0 — 4/0/0 |
| Birch, do. | | 3/5/0 — 4/10/0 |
| Elm, do. | | 3/10/0 — 4/15/0 |
| Fir, Dantzic, &c. | | 1/10/0 — 3/10/0 |
| Oak, do. | | 3/0/0 — 5/5/0 |
| Canada | | 5/10/0 — 7/0/0 |
| Pine, Canada red | | 2/10/0 — 3/10/0 |
| Do, yellow | | 2/10/0 — 5/0/0 |
| Lath, D'ntsic, fath | | 5/0/0 — 6/0/0 |
| St. Petersburg | | 5/0/0 — 7/0/0 |
| Deals, Finland, 2nd & 1st std | 100 | 8/10/0 — 10/0/0 |
| Do, 4th & 3rd | | 7/0/0 — 8/10/0 |
| Do. Riga | | 7/0/0 — 8/0/0 |
| St. Petersburg, 1st yellow | | 11/0/0 — 13/0/0 |
| Do. 2nd yellow | | 8/0/0 — 10/0/0 |
| Do. white | | 7/10/0 — 11/0/0 |
| Swedish | | 8/0/0 — 16/0/0 |
| White Sea | | 8/0/0 — 18/0/0 |
| Canada, Pine 1st | | 20/0/0 — 26/0/0 |
| Do. do. 2nd | | 14/10/0 — 16/0/0 |
| Do. do. 3rd, &c. | | 8/0/0 — 10/5/0 |
| Do. Spruce. 1st | | 8/10/0 — 11/0/0 |
| Do. do. 3rd & 2nd | | 6/15/0 — 8/0/0 |
| New Brunswick | | 7/0/0 — 7/10/0 |
| Battens, all kinds | | 3/10/0 — 15/10/0 |
| Flooring Boards, sq., 1 in. prep. 1st | | 0/8/0 — 0/14/0 |
| Do. 2nd | | 0/7/0 — 0/11/0 |
| Other qualities | | 0/4/0 — 0/9/0 |
| Cedar, Cuba | ft. | /3½ — /4½ |
| Honduras, &c. | | /2½ — /4 |
| Mahogany, Cuba. | | /4½ — /6½ |
| St. Domingo, cargo av | | /4½ — 2/0 |
| Mexican do. do | | /4 — /5 |
| Tobasco do. do | | /5½ — /7 |
| Honduras do. | | /5½ — /6½ |
| Box, Turkey | ton | 4/0/0 — 13/0/0 |
| Rose, Rio | | 10/0/0 — 20/0/0 |
| Bahia | | 9/0/0 — 18/0/0 |
| Satin, St. Domingo | ft. | 0/0 8 — 0/1/3 |

| TIMBER (*continued*). | | |
|---|---|---|
| Satin, Porto Rico | | 0/0/8 — 0/1/6 |
| Walnut, Italian | | 0/0/3½ — 0/0/7 |
| **METALS.** | | |
| IRON—Pig, in Scotland | ton | 2/1/1 — 0/0/0 |
| Bar, Welsh, in London | | 5/17/6 — 6/0/0 |
| Do. do. at works in Wales | | 5/7/6 — 5/10/0 |
| Do. Staffordshire, in London | | 6/5/0 — 6/15/0 |
| COPPER—British, cake and ingot | | 48/10/0 — 49/0/0 |
| Best selected | | 49/15/0 — 50/5/0 |
| Sheets, strong | | 58/0/0 — 59/0/0 |
| Chili, bars | | 45/13/9 — 46/1/3 |
| YELLOW METAL | lb. | 0/0/5½ — 0/0/5¾ |
| LEAD—Pig, Spanish | ton | 10/12/6 — 10/15/0 |
| English, com. brands | | 10/17/6 — 11/0/0 |
| Sheet, English, 3 lbs. per sq. ft. and upwards | | 12/5/0 — 0/0/0 |
| Pipe | | 12/15/0 — 0/0/0 |
| ZINC—English sheet | ton | 25/10/0 — 0/0/0 |
| Vieille Montagne | | 26/5/0 — 0/0/0 |
| TIN—Straits | | 90/10/0 — 90/12/6 |
| Australian | | 90/15/0 — 91/0/0 |
| English Ingots | | 93/15/0 — 94/0/0 |
| **OILS.** | | |
| Linseed | ton | 18/7/6 — 18/12/6 |
| Cocoanut, Cochin | | 24/10/0 — 0/0/0 |
| Do. Ceylon | | 22/0/0 — 0/0 0 |
| Palm, Lagos | | 23/5/0 — 23/10/0 |
| Rapeseed, English pale | | 24/15/0 — 25/10/0 |
| Do. brown | | 23/5/0 — 23/10/0 |
| Cottonseed ref. | | 19/0/0 — 0/0/0 |
| Oleine | | 21/10/0 — 22/10/0 |
| Lubricating, U.S. | | 4/0/0 — 5/0/0 |
| Do. refined | | 5/10/0 — 0/0/0 |
| TAR—Stockholm | barrel | 0/19/0 — 1/0/0 |
| Archangel | | 0/12/6 — 0/0/0 |

## TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Thursdays.*]

ASHTON-ON-RIBBLE (near Preston).—For the erection of a Wesleyan Chapel, to accommodate 640 persons, in Wellington-road, Ashton-on-Ribble. Mr. Walter Barrow, architect, Preston:—

| | | | |
|---|---|---|---|
| Walker | £3,425 | Croft | £3,201 |
| Lucas | 3,235 | Baldwin (accepted) | 3,000 |

BECKENHAM.—For erecting shop and dwelling-house at Croydon-road, for Messrs. A. C. S. & H. Crowley. Mr. John Farrer, architect, No. 20, Finsbury-pavement, E.C. Quantities supplied:—

| | | | |
|---|---|---|---|
| W. Smith | £1,237 | Bullock | £1,120 |
| Smith & Sons | 1,215 | Taylor | 1,095 |
| Harris & Fagg | 1,187 | Mid Kent Building Co. | 1,085 |
| Mattock Bros. | 1,175 | G. H. Martin & Co., West Croydon (accepted) | 1,073 |
| Palmer | 1,150 | | |

BRIGHTON.—For the erection of mission hall and school, Sutherland-road. Mr. W. H Nash, architect, 42, Ship-street, Brighton. Quantities by architect:—

| | | | |
|---|---|---|---|
| W. Allfrey | £1,448 | Sattin & Evershed | £1,250 |
| W. Taylor | 1,295 | V. P. Freeman | 1,226 |
| A. Wilkinson | 1,274 | A. E. Lockyer (accepted) | 1,220 |

[All of Brighton.]

CLACTON-ON-SEA.—For alterations to No. 6, North-avenue, for Mr. J. Bearman. Mr. A. W. Huxter, surveyor:—

Mark Potts (accepted) ..... £103 0 0

CLACTON-ON-SEA.—Accepted for the erection of villa residence in Rosemary-road, for Mr. J. T. Buxton:—

Mark Potts, Clacton-on-Sea ..... £380 0 0

COVENTRY.—For erecting the Coventry Public Baths. Mr. Harold T. Burgess, and Messrs. Spalding & Cross, joint architects. Quantities by Mr. F. G. W. Buss, 15, Furnival's-Inn, W.C.:—

| | £. | | £. A |
|---|---|---|---|
| Balsam Bros. | 18,999 | .... | 949 |
| F. N. Stephens | 18,600 | .... | 1,170 |
| Gould & Brand | 18,179 | .... | 762 |
| J. T. Wingrove | 16,978 | .... | 987 |
| Reid, Blight, & Co. | 16,935 | .... | 899 |
| Thos. Lowe & Sons | 16,550 | .... | 960 |
| John Allen & Sons | 16,417 | .... | 995 |
| G. F. Smith & Son s | 16,290 | .... | 970 |
| C. G. Hill | 15,076 | .... | 834 |
| Chas. W. King | 13,500 | .... | 790 |

A Extra for carrying the foundations 4 ft. lower.

CREDITON (Devon.).—For new frontage to banking premises for the Devon and Cornwall Banking Company, Limited. Mr. Geo. Soudon Bridgman, architect, Torquay:—

W. P. Berry, Crediton* ..... £492

*Accepted.

DUNCHIDEOCK (Devon).—For the restoration of rood-screen, Dunchideock Church, Devon, for the Rector and Restoration Committee:—

| | | | |
|---|---|---|---|
| Herbert Read, Exeter* | £231 | Harry Hems | £225 |

* Accepted.

KINGSBRIDGE (Devon.).—For proposed new banking premises and post office, for the Devon and Cornwall Banking Company, Limited. Mr. G. Soudon Bridgman, architect, Torquay:—

| | | | |
|---|---|---|---|
| J. P. Berry | £3,350 | Rabbich & Brown | £3,115 |
| G. Hooper | 3,340 | Drew Bros. | 2 912 |
| G. Shellebeer | 3,230 | H. Webber, Paignton* | 2,906 |
| J. Finch | 3,157 | | |

*Accepted.

LEISTON (Suffolk).—For proposed alterations and additions to Aldringham House, Leiston, Suffolk, for Mr. Frank Garrett. Mr. G. W. Cotman, architect:—

| | | | |
|---|---|---|---|
| Grimwood & Sons | £2,899 | Rannacles | £2,758 |
| Bennett | 2,820 | Girling & Co. | 2,755 |

LONDON.—For alterations and additions to the "Blakesley Arms," Station-road, Manor Park, E., for Mr. T. Bettesworth. Mr. Fred. A Ashton, architect, 3, Crooked-lane, E.C.:—

| | | | |
|---|---|---|---|
| W. Shurmur | £594 | F. Voller | £485 |
| North Bros. | 534 | W. Watson | 462 |
| Coulsell Bros. | 487 | Hearle & Farrow (accepted) | 460 |

LONDON.—For providing and fixing heating apparatus on the low pressure hot-water system for the new school now in course of erection on the Ilderton-road site, Rotherhithe New-road, for the School Board for London. Mr. T. J. Bailey, Architect:—

| | | | |
|---|---|---|---|
| Russell & Co. | £427 | R. H. & J. Pearson | £380 |
| R. Crane | 398 | T. Potter & Sons* | 365 |
| W. G. Cannon | 394 | | |

* Recommended by the Works Committee for acceptance.

LONDON.—For providing and fixing heating apparatus, exclusive of radiators, on the low-pressure hot-water system for the undermentioned new schools now in course of erection, for the School Board for London. Mr. T. J. Bailey, Architect:—

*High-street, Plumstead.*

| | | | |
|---|---|---|---|
| Wenham & Waters, Ltd. | £430 0 | J. & F. May | £407 0 |
| J. Wontner Smith, Gray, & Co. | 420 0 | Purcell & Nobbs | 392 0 |
| | | W. G. Cannon* | 388 10 |

*Chisenhale-road, Bow.*

| | | | |
|---|---|---|---|
| Fraser & Fraser | £790 0 | Jones & Attwood | £416 0 |
| R. Dawson & Co., Ltd. | 498 0 | W. G. Cannon | 398 10 |
| Wenham & Waters, Ltd. | 435 0 | R. Crane* | 373 0 |
| J. Wontner Smith, Gray, & Co. | 418 0 | | |

*Honeywell-road, Wandsworth-common.*

| | | | |
|---|---|---|---|
| T. & F. May | £495 0 | R. Crane | £462 0 |
| Purcell & Nobbs | 474 0 | Potter & Sons* | 423 0 |

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting the "Wheatsheaf" Hotel, Balham, for Messrs. Tucker Bros. Mr. W. Hilton Nash, architect, 5, Adelaide-place, London-bridge:—

| | | | |
|---|---|---|---|
| R. J. Humphries | £8,153 | B. E. Nightingale | £7,118 |
| Lordell & Sons | 7,549 | T. Gregory & Co. | 6,945 |
| Edwards & Medway | 7,300 | Turtle & Appleton* | 6,800 |
| J. Allen & Sons | 7,265 | Leeks & Hooker | 6,666 |
| D. Charteris | 7,242 | | |

* Accepted.

LONDON.—For the erection of fire-escape stairs at the Rotherhithe Infirmary, for the Guardians of the St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge, S.E.:—

| | | | |
|---|---|---|---|
| The Coalbrookdale Co. | £1,441 | G. F. Darby & Co. | £720 |
| Hayward Bros. & Eckstein | 1,098 | The Constructional Iron Co. | 588 |
| T. & W. Cole | 834 | | |
| J. F. Clark | 829 | | |

LONDON.—For making roads and laying out grounds at the Rotherhithe Infirmary, for the Guardians of the St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London-bridge, S.E.:—

| | |
|---|---|
| The Seyssell Asphalte Co. | £715 0 0 |
| Hobman & Co. (accepted) | 669 0 0 |

LONDON.—For works at the Chancery-lane Safe Deposit extension, Chancery-lane, W.C., for Mr. Thomas Clarke. Mr. William A. Burr, architect, 65, Chancery-lane, W.C.:—

*Tiling.*

| | |
|---|---|
| Doulton & Co. (accepted) | £244 0 0 |

*For Brass-work to new Staircase, &c.*

| | |
|---|---|
| Messrs. Comyn Ching & Co. (accepted) | £206 7 6 |

*For Marble-work to Steps.*

| | |
|---|---|
| Mullis (accepted) | £20 0 0 |

NANTGAREDIG (Caermarthenshire).—For the erection and completion of stables and laundry, for Mr. E. H. Bath, J.P. Messrs. J. Buckley Wilson & Glendinning Moxham, architects, Swansea:—

| | | | |
|---|---|---|---|
| Dd. Jenkins | £1,420 | Bennett Bros. | £1,025 |
| Thomas Watkins & Co. | 1,391 | J. D. Williams, Knighton* | 995 |
| Hy. Billings | 1,075 | | |

* Accepted.

NANTGAREDIG (Caermarthenshire).—For the erection and completion of a lodge, for Mr. E. H. Bath, J.P. Messrs. J. Buckley Wilson & Glendinning Moxham, architects, Swansea:—

| | | | |
|---|---|---|---|
| Hy. Billings | £544 10 0 | Thomas Watkins & Co. | £466 14 3 |
| Bennett Bros. | 500 0 0 | J. D. Williams, Knighton* | 415 0 0 |
| Dd. Jenkins | 490 0 0 | | |

* Accepted.

NEATH.—Accepted for the erection and completion of stables near the Gnoll, Neath. Messrs. J. Buckley Wilson & Glendinning Moxham, architects, Swansea:—

| | |
|---|---|
| D. C. Jones & Co., Gloucester | £220 0 0 |

PLYMOUTH.—For the reconstruction of a portion of the Public Market, in three sections, containing the Corn Exchange, fourteen shops, twenty-five butchers' stalls, and covered entrances to markets. Mr. Charles King, architect, Plymouth. Quantities by the architect:—

| | | | |
|---|---|---|---|
| A. R. Debnam | £23,164 | Tozer & Son | £19,423 |
| G. Shellabeer | 22,735 | A. W. Coles | 19,250 |
| J. P. Berry | 21,521 | J. Finch | 19,054 |
| J. H. Backell | 21,013 | A. R. Lethbridge & Son | 18,640 |
| Reed, Blight, & Co. | 20,142 | T. May | 18,488 |
| Wm. Trevena | 19,597 | S. Roberts* | 17,725 |
| Pethick Bros. | 19,439 | | |

* Accepted.

PWLLHELI.—For the construction of outfall-sewer, Pwllheli. Messrs. Thomas Roberts & Son, engineers, Portmadoc:—

| | | | |
|---|---|---|---|
| Fortescue & Co. | £5,989 0 | Owen Morris | £3,765 0 |
| Griffith Griffiths | 4,977 0 | Humphrey Thomas | 3,257 10 |

[Engineers' estimate, £3,000.]

REPTON (Derbyshire).—For the erection of a new sanitorium for the school at Repton, for the trustees of Sir John Port's Charity. Messrs. John Shaw & Son, architects, The College, All Saints', Derby. Quantities by the architects:—

| | | | |
|---|---|---|---|
| W. A. Stevenson | £6,200 0 0 | Jos. Parker | £5,295 0 0 |
| J. Lowe & Sons | 5,760 0 0 | Arthur Brown | 5,262 0 0 |
| Walker & Slater | 5,600 0 0 | Bullock & Barton | 5,229 0 0 |
| Wm. Wood | 5,520 19 10 | Joseph Dickinson | 5,198 0 0 |
| Geo. Wagg | 5,386 0 0 | Robert Platts, Etwall* | 5,100 0 0 |
| W. Walkerdine | 5,350 0 0 | H. Vernon | 4,915 0 0 |

* Accepted conditionally.

SHANGHAI.—For the supply of 16,500 tons of broken granite, 3,000 tons of sand, and 2,000 tons of broken bricks, for the Shanghai Municipal Council. Mr. Chas. Mayne, Engineer and Surveyor:—

| Contractor. | Broken Bricks. | Large Granite. | 1½ inch Granite. | ¾ inch Granite. | Sand. |
|---|---|---|---|---|---|
| | per ton. | per ton. | per ton. | per ton. | per ton. |
| Yung Ming Cheng | 2 6½ | 2 4½ | 3 3½ | 3 9½ | 3 1½ |
| Ling Foh Kee | 1 7¼ | 2 4½ | 3 4 | 3 9½ | 2 10½ |
| Joe & Ming Kee | 2 4½ | 2 4½ | 3 4 | 3 6½ | 2 11 |
| Fong Kee | 2 3 | 2 3½ | 3 3½ | 3 7½ | 2 10 |
| Yah Kee & Co. | 2 2½* | 2 2½* | 2 10½* | 3 6½* | 2 9½* |

* Accepted.

SWANSEA.—For the erection and completion of St. Thomas's Vicarage. Messrs. J. Buckley Wilson & Glendinning Moxham, architects, Swansea:—

| | | | |
|---|---|---|---|
| Hy. Welch | £1,715 | Thomas Watkins & Co. | £1,400 |
| J. D. Williams | 1,582 | Stephens & Bastow | 1,351 |
| D. C. Jones | 1,496 | John F. Weaver | 1,343 |
| Bennett Bros. | 1,460 | Gustavus Bros. | 1,285 |
| D. Jenkins | 1,425 | Hy. Billings, Swansea* | 1,245 |

* Accepted.

SWANSEA.—For the erection and completion of residence in Sangland, near Swansea. Messrs. J. Buckley Wilson & Glendinning Moxham, architects:—

| | | | |
|---|---|---|---|
| G. Mercer | £2,034 | Thomas Watkins & Co. | £1,750 |
| J. D. Williams | 1,885 | G. Morris | 1,722 |
| D. C. Jones & Co. | 1,885 | Hy. Billings | 1,635 |
| Gustavus Bros. | 1,867 | Dd. Jenkins, Swansea* | 1,600 |
| Bennett Bros. | 1,770 | | |

* Accepted.

WORMLEY (Herts).—For the erection of new parish room at Wormley, Herts, for the Rev. F. W. Greenstreet. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

| | |
|---|---|
| Archer | £441 0 0 |
| G. A. Hunt, Broxbourne (accepted) | 413 14 0 |

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**1892.**

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| | | | |
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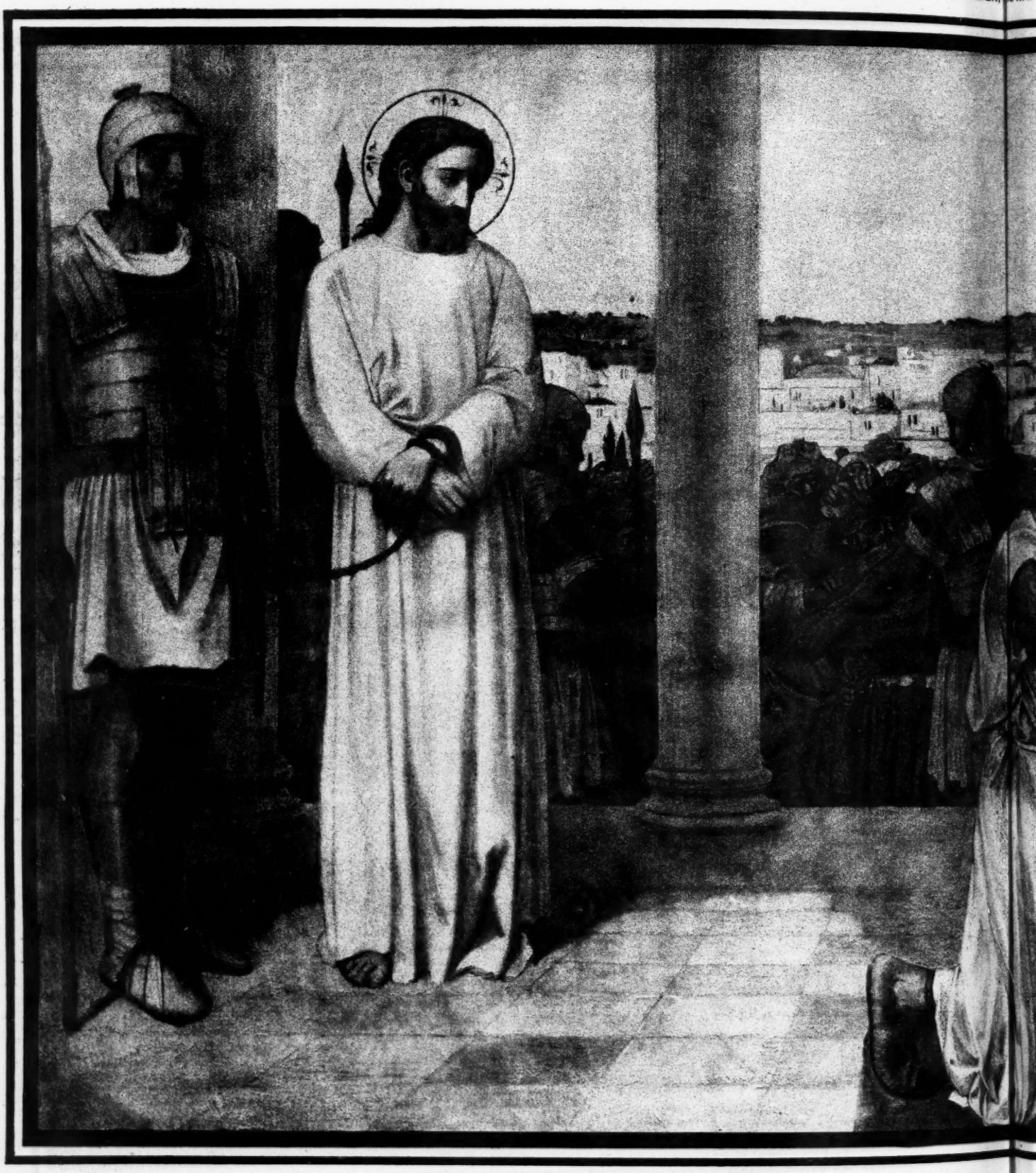

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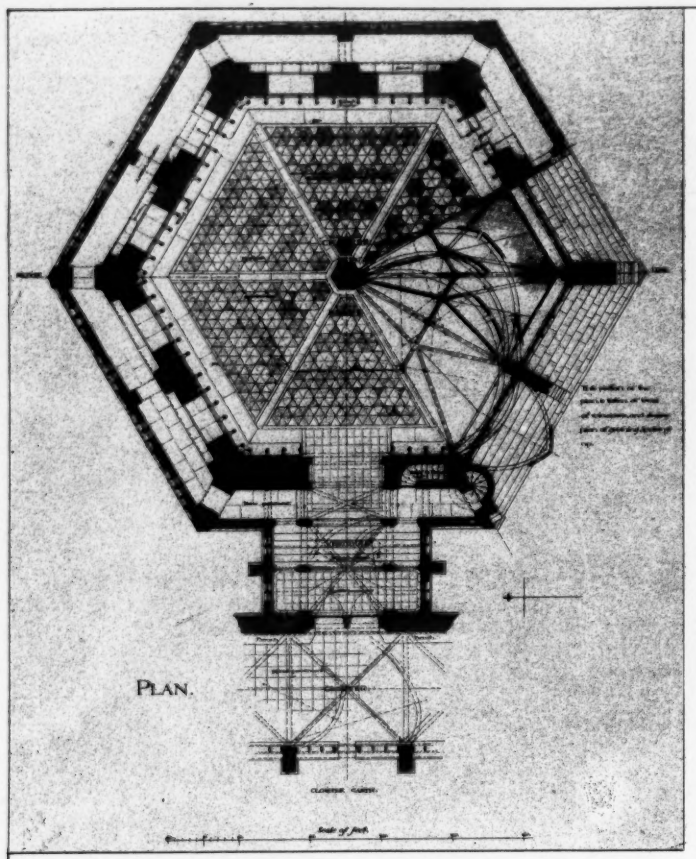
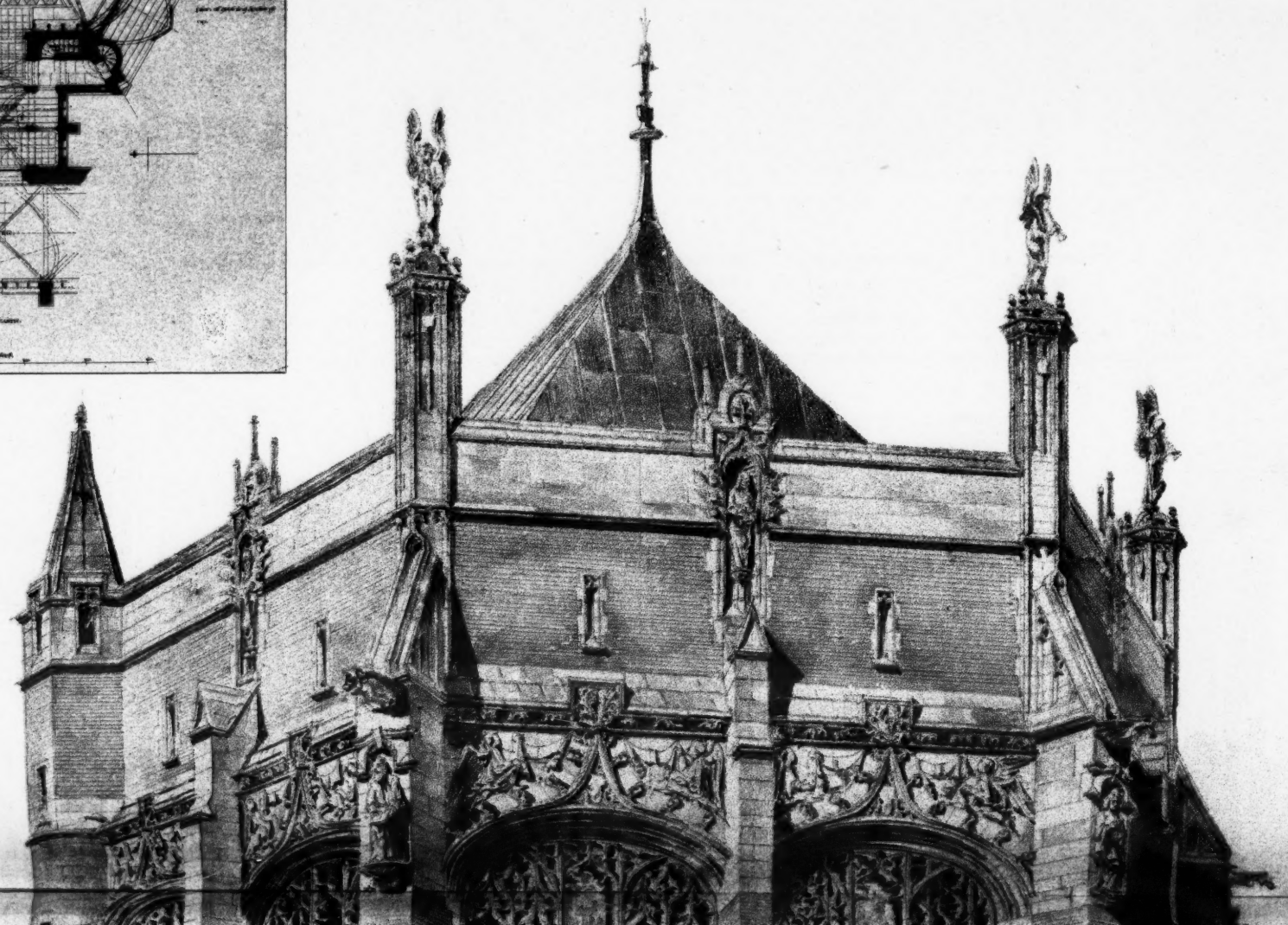
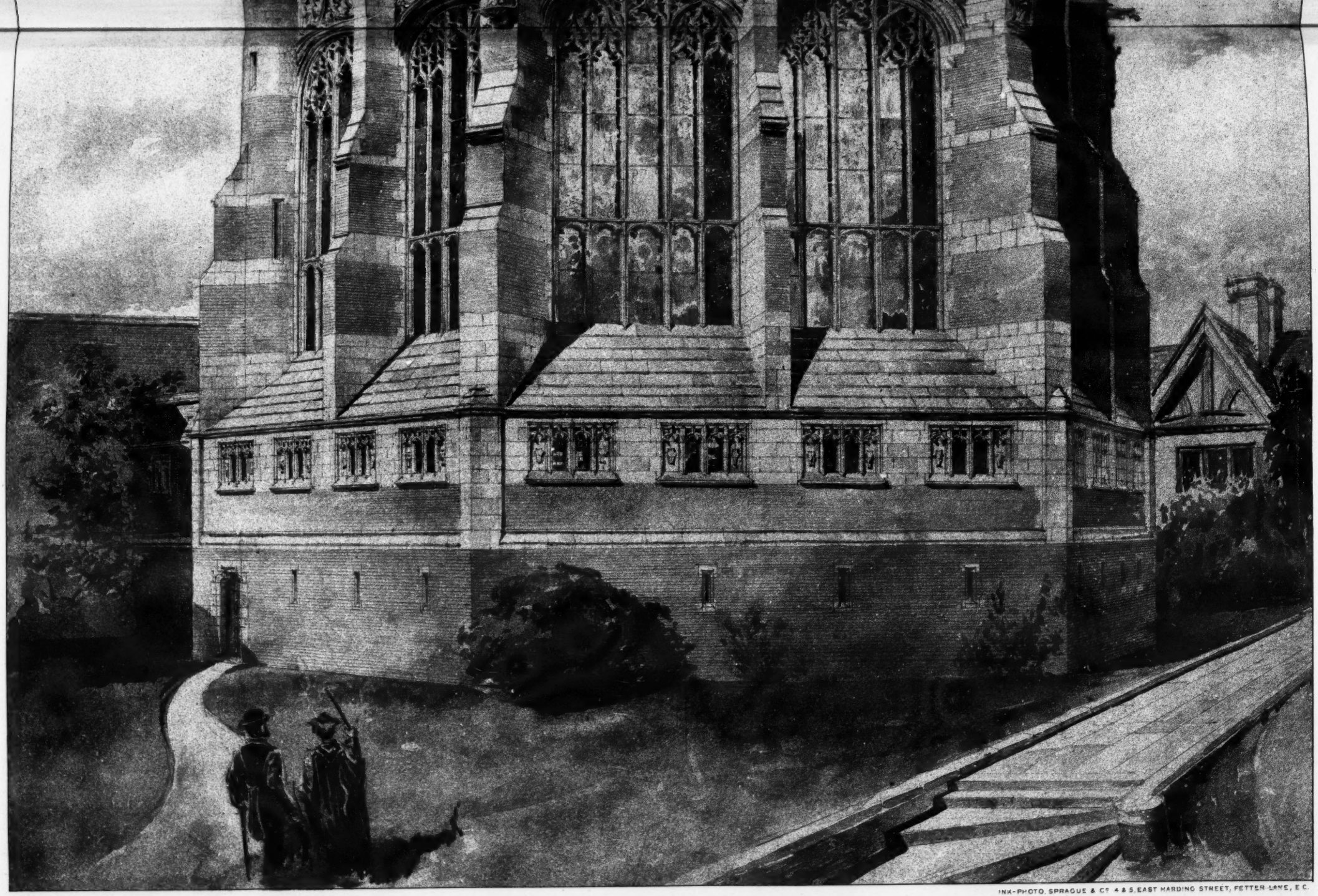
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

L OF MAYNOOTH COLLEGE, DUBLIN.—By Mr. N. H. J. Westlake, F.S.A.



PLAN.

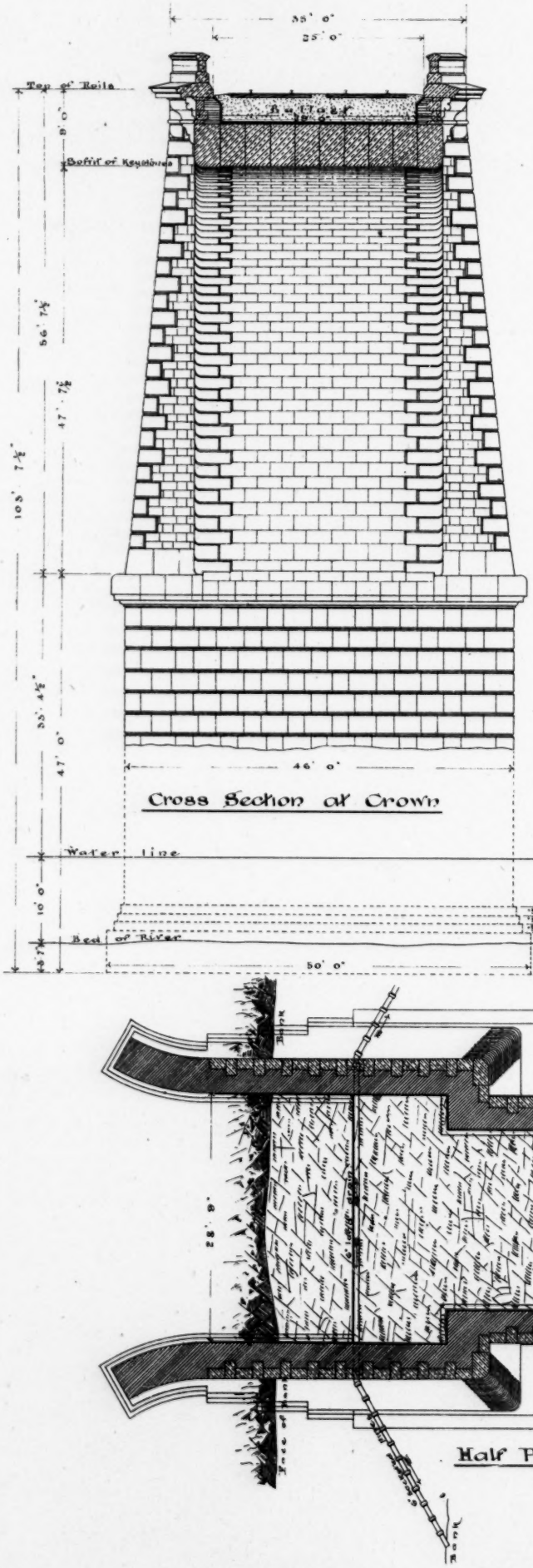




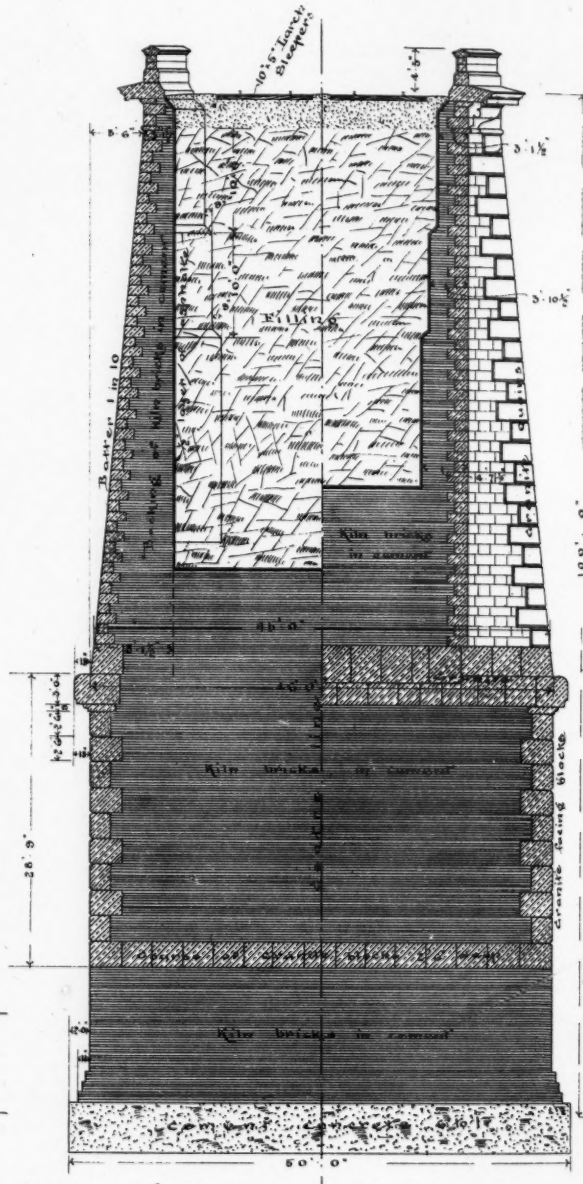
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

DESIGN FOR A CHAPTER-HOUSE.—By Mr. John Begg, A.R.I.B.A.

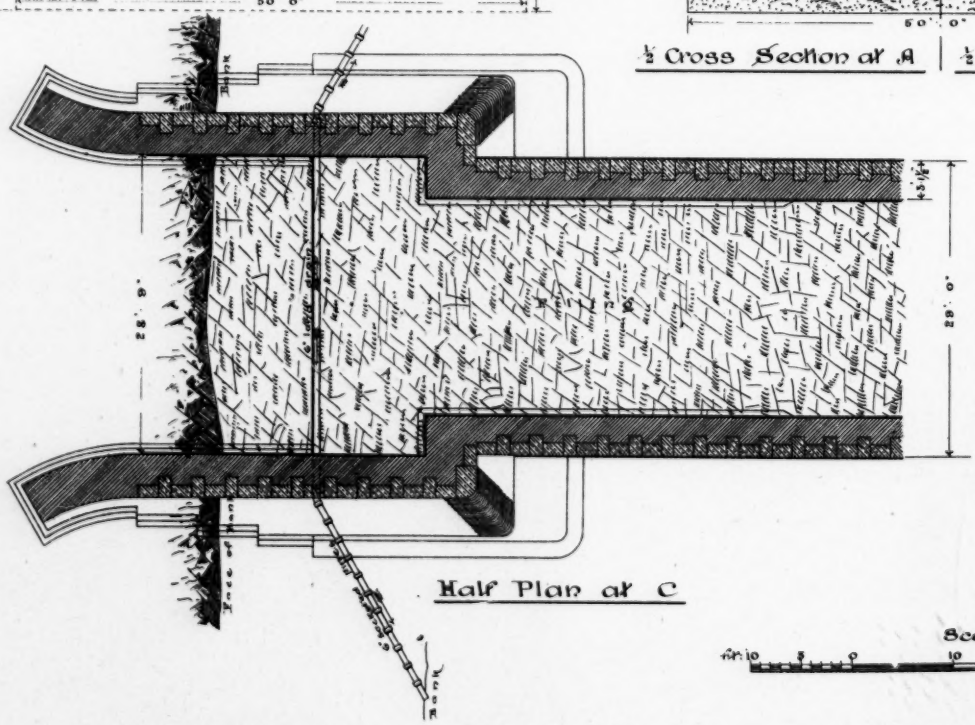
*Medal of Merit, Soane Medallion Competition, 1892.*




Cross Section at Crown




½ Cross Section at A | ½ Cross Section at B

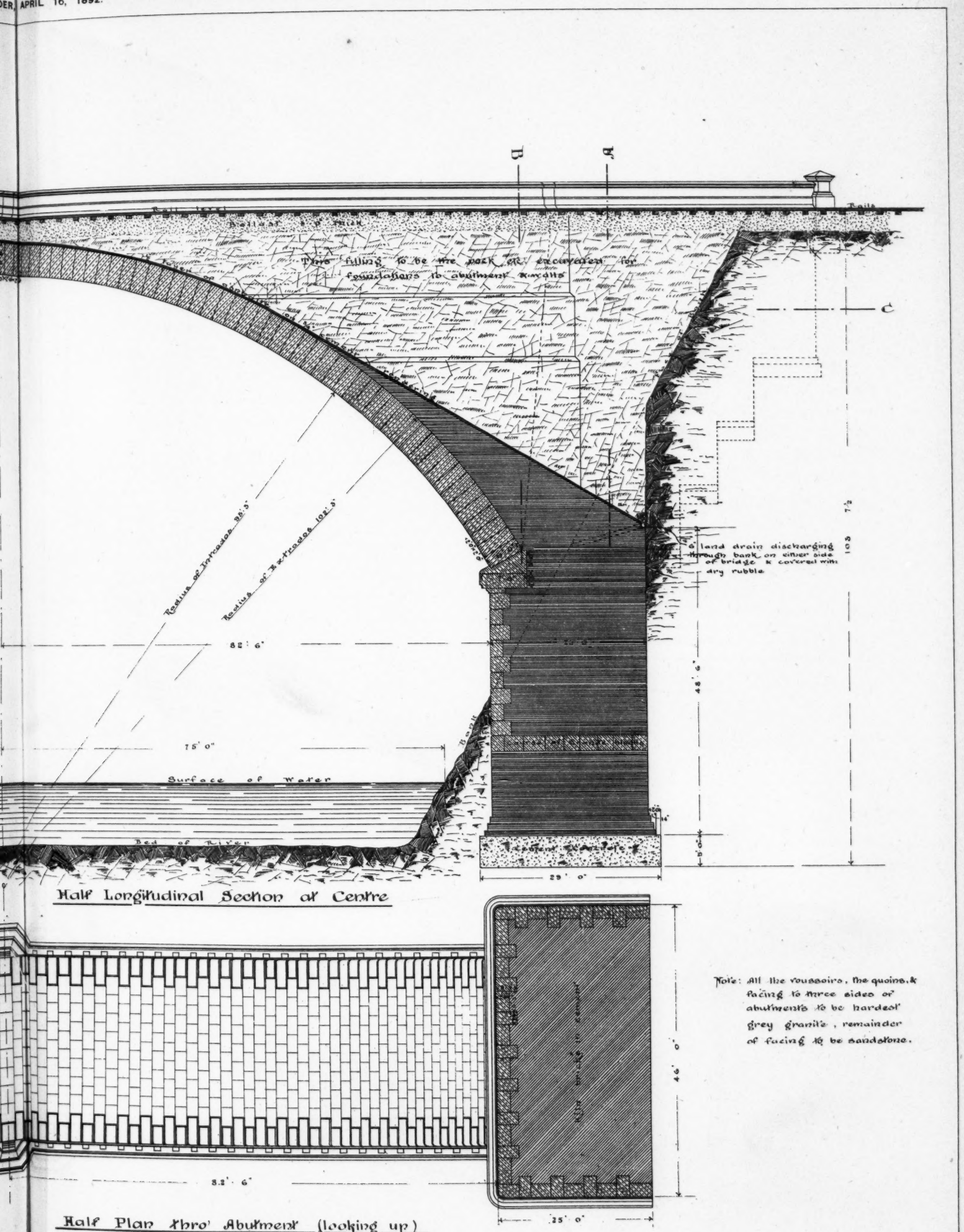



Half Plan at C

Scale: 8 feet to 1 inch



*Grissell Gold Medal, 1892.*




Note: All the voussoirs, the quoins, & facing to three sides of abutments to be hard coal grey granite, remainder of facing to be sandstone.

PHOTO-LITHO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

AILWAY BRIDGE.—By Mr. Harold Harlock.

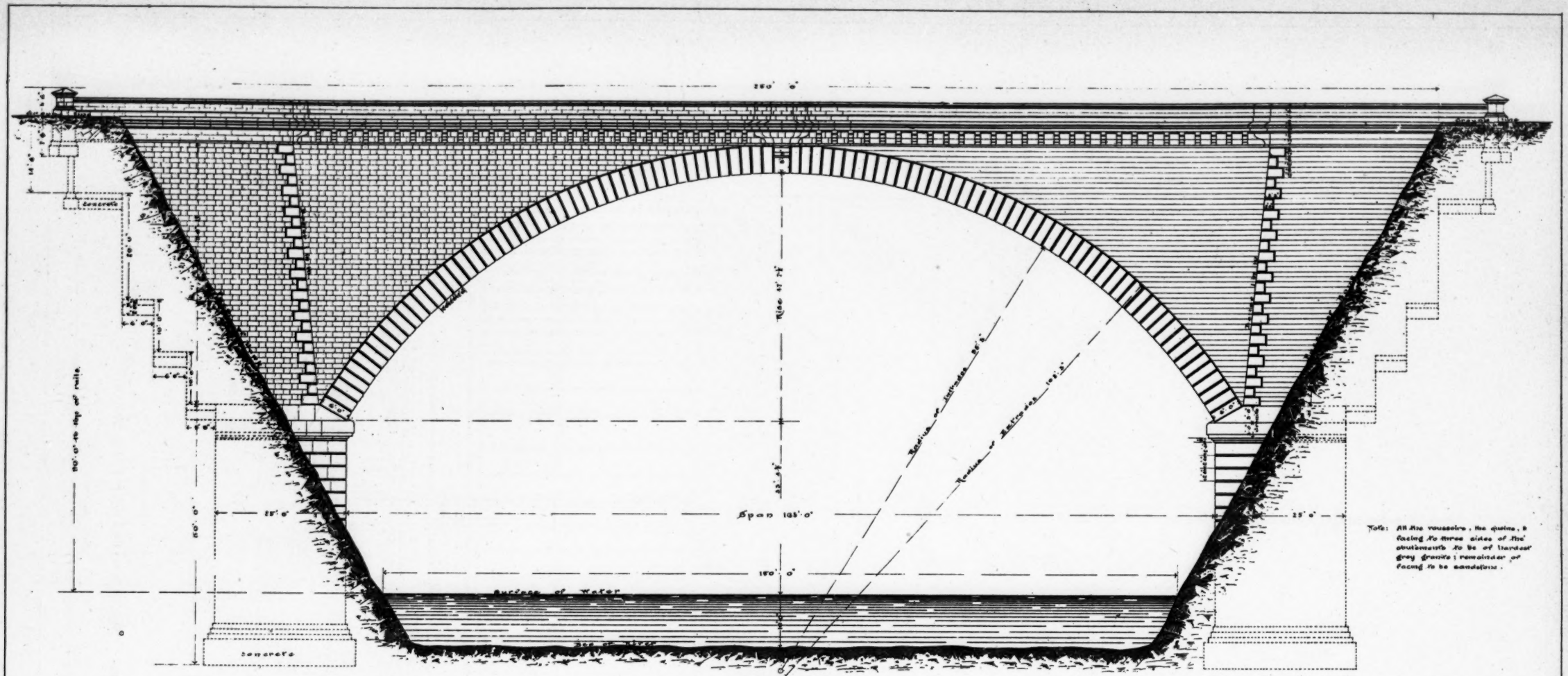
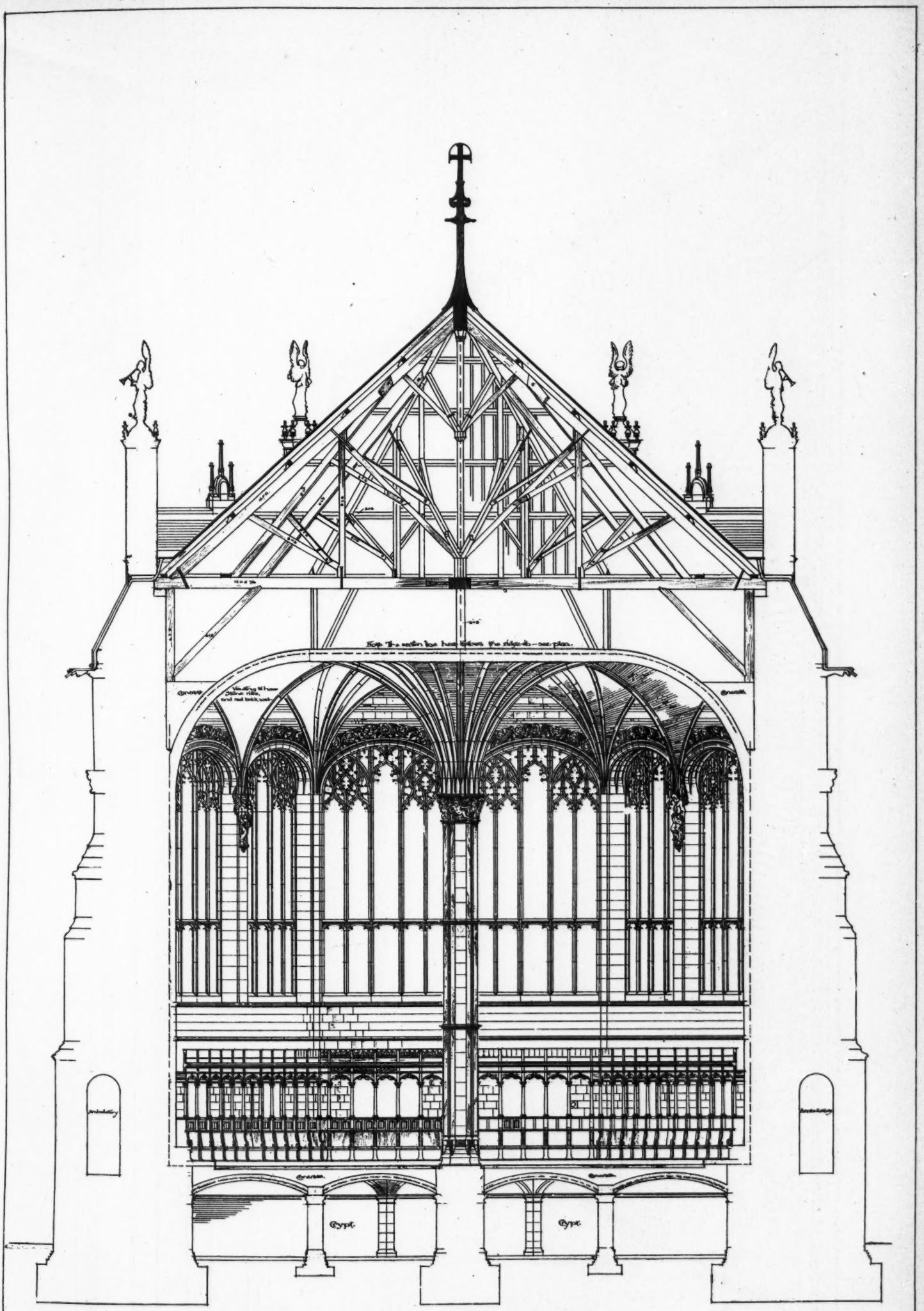

Span 181'-0"
Concrete
Concrete
Surface of Water
Bed of River
Elevation
Total length 272'-0"
Plan at rail level
Scale 8 feet to one inch
Note: All the voussoirs, the quoins, & facing to three sides of the abutments to be of hardest grey granite; remainder of facing to be sandstone.

PHOTO-LITHO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

*Grissell Gold Medal, 1892.*

DESIGN FOR A STONE RAILWAY BRIDGE.—By Mr. Harold Harlock.




SECTION THRO' CHAPTER-HOUSE.

PHOTO-LITHO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

DESIGN FOR A CHAPTER-HOUSE.—By Mr. John Begg, A.R.I.B.A.

*Medal of Merit, Soane Medallion Competition, 1892.*

DESIGN FOR A STONE RAILWAY BRIDGE.—By Mr. Harold Harlock.

*Grissell Gold Medal, 1892.*